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ABSTRACT

This study addressed the questions and the challenges presented in the report by the United States Department of Education, Office of Educational Research and Improvement, entitled "National Excellence: A Case for Developing America's Talent." Consistent with the priorities of the Jacob Javits Act, this study was designed to assess the impact of providing gifted education pedagogy, specifically, a series of enrichment clusters, to the entire population of two schools in economically disadvantaged urban settings with a high percentage of minority students. Three elementary schools in two urban districts were selected to participate in the study. In one school from each of these districts, enrichment clusters were implemented and one school served as a comparison site. Students in each treatment school attended a pilot and two series of enrichment clusters. Students in all schools were assessed regarding their attitudes toward school and their content area preferences, and students from the treatment schools responded to questions regarding the enrichment clusters. Data were also collected from parents and teachers related to school satisfaction, use of enrichment strategies, and other variables. Qualitative data were collected from teachers, administrators, students, and parents about the implementation of enrichment clusters. With regard to student interests, attitudes, and products, the findings were positive. Students indicated that they enjoyed their clusters, and students involved in the clusters displayed stronger interests than students from the comparison school. Approximately 90% of the students completed products in their clusters and there was no difference in the frequency of products completed when examined by achievement, gender, special program placement, or ethnicity. With regard to the quality of products, no differences were found among various achievement levels of students, perhaps indicating interests and commitment help to increase the quality of the products developed by students of various achievement levels in the enrichment clusters. Teacher practices were affected both in the enrichment clusters and in the teachers' regular classrooms. Advanced content was integrated into 95% of the clusters and included areas such as introduction of new concepts and content, teaching specific investigative methodologies, use of advanced vocabulary and authentic "tools," and use of advanced thinking and problem solving strategies. Approximately 60% of the teachers who facilitated clusters indicated that they transferred strategies and content from the clusters into their classrooms, although this had not been requested of these teachers. (Author)

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Extending the Pedagogy of Gifted Education to All Students

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THE NATIONAL RESEARCH CENTER ON THE GIFTED AND TALENTED

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The participating universities include The University of Georgia, The University of Virginia, and Yale University, as well as a research unit at The University of Connecticut.

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ABSTRACT

This study addressed the questions and the challenges presented in the report by the United States Department of Education, Office of Educational Research and Improvement, entitled *National Excellence: A Case for Developing America's Talent.* Consistent with the priorities of the Jacob Javits Act, this study was designed to assess the impact of providing gifted education pedagogy, specifically, a series of enrichment clusters, to the entire population of two schools in economically disadvantaged urban settings with a high percentage of minority students. Enrichment clusters provide a regularly scheduled time for students and adults, who share a common interest and purpose, to come together. These clusters are based on the acquisition of advanced content through inductive opportunities for multi-age, cross-grade student participation in open-ended investigations of student interests. Three elementary schools in two urban districts were selected to participate in the study. In one school from each of these districts, enrichment clusters were implemented and one school served as a comparison site. Students in each treatment school attended a pilot and two series of enrichment clusters. Students in all schools were assessed regarding their attitudes toward school and their content area preferences, and students from the treatment schools responded to questions regarding the enrichment clusters. Data were also collected from parents and teachers related to school satisfaction, use of enrichment strategies, and other variables. Qualitative data were collected from teachers, administrators, students, and parents about the implementation of enrichment clusters.

The data analyses dealt with various categories of program success, student interests, student attitudes, student products, parental attitudes, and teacher practices. Success of the enrichment clusters in both sites was evident in a variety of ways. Implementation was done successfully as each urban school adapted the program to fit individual school schedules and needs. Both schools continued their enrichment cluster program and serve as model sites for other schools interested in implementing similar programs. Community members and parents were actively involved with the program on a regular basis, and the majority of teachers indicated that they enjoyed facilitating enrichment clusters. Time was able to be set aside each week when the focus was on student and teacher interests, where students have choice, and when there was challenge and enjoyment in learning.

With regard to student interests, attitudes, and products, the findings were positive. Students indicated that they enjoyed their clusters, and students involved in the clusters displayed stronger interests than students from the comparison school. Approximately 90% of the students completed products in their clusters and there was no difference in the frequency of products completed when examined by achievement, gender, special program placement, or ethnicity. With regard to the quality of products, no differences were found among various achievement levels of students, perhaps indicating interests and commitment

help to increase the quality of the products developed by students of various achievement levels in the enrichment clusters.

Teacher practices were affected both in the enrichment clusters and in the teachers' regular classrooms. Advanced content was integrated into 95% of the clusters and included areas such as introduction of new concepts and content, teaching specific investigative methodologies, use of advanced vocabulary and authentic "tools," and use of advanced thinking and problem solving strategies. Approximately 60% of the teachers who facilitated clusters indicated that they transferred strategies and content from the clusters into their classrooms, although this had not been requested of these teachers.

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EXECUTIVE SUMMARY

Introduction

During the 1994-95 school year, the University of Connecticut site of The National Research Center on the Gifted and Talented (NRC/GT) conducted a study to examine the effects of implementing an innovation called enrichment clusters with all students. Enrichment clusters facilitate the use of some pedagogical strategies originally used in the field of gifted education, but they are designed to deliver enrichment to all students during a specified time period during the school week. The federal report, *National Excellence: A Case for Developing America's Talent* (U.S. Department of Education, 1993), includes the following goals: provide more challenging opportunities to learn, increase learning opportunities for disadvantaged and minority children with outstanding talents, broaden the definition of gifted, and emphasize teacher development. This report emphasized the role gifted education programs have had on general education:

> Over the past 20 years, while the regular school program focused on basic skills and minimum standards, programs for gifted and talented students served as laboratories for innovative and experimental approaches to teaching and learning. A variety of educational options were developed in programming and scheduling. Many new programs focused on complex thinking strategies and problem solving and used sophisticated teaching strategies and . . . developed alternative teaching strategies and interesting curriculum approaches . . . . Now many educators believe that the knowledge and experience that gifted education has gained . . . can be used to upgrade all of education and are calling for this to be done. (p. 23)

The report further called for the improvement of education for *all* of America's students and stated that schools must:

- Expand effective education programs and incorporate more advanced materials into the regular school program;
- Provide all students with opportunities to solve problems, analyze materials and situations, and learn from real-life experiences;
- Serve students identified as having outstanding talent in many places—the regular classroom, a special class, the community, at a university or a museum, in front of a computer, or anywhere the opportunity meets the need;
- Create flexible schools that enable all students, including the most able, to be grouped and regrouped according to their needs and interests. (p. 14)

Enrichment clusters are a component of The Schoolwide Enrichment Model (Renzulli, 1994; Renzulli & Reis, 1985) which meet these challenges as they are designed to offer all students an opportunity for challenging, self-selected, real world learning experiences. Within clusters, students are grouped across grade levels by interests and focused toward the production of real world products or services. Gifted programs have developed an impressive menu of curricular adaptations, independent study, and thinking skill strategies that can be used to improve education for all students (Renzulli, 1994; Renzulli & Reis, 1991; Tomlinson & Callahan, 1992; U.S. Department of Education, 1993). Tomlinson and Callahan (1992) cite several contributions of gifted education to general education including:

1. Expanded views of intelligence (Gardner, 1983; Guilford, 1967; Reis & Renzulli, 1982; Renzulli, 1978; Sternberg, 1985, 1991);
2. Attention to underserved populations (Baldwin, 1985; Callahan, 1986; Frasier, 1989; Torrance, 1977; Whitmore, 1980);
3. Instructional techniques (Brandwein, 1981; Maker, 1982; Passow, 1982; Renzulli, 1977; VanTassel-Baska, 1988; Ward, 1980);
4. Differentiation of content, process, and product as well as theme-based learning (Kaplan, 1986), self-directed learning (Treffinger, 1986), and student productivity (Renzulli, 1977);
5. Individualization (Benbow, 1986; Renzulli & Smith, 1979);
6. Teaching models (Feldhusen & Kolloff, 1986; Kaplan, 1986; Renzulli, 1977; Renzulli & Reis, 1985; Schlichter, 1986; Taylor, 1986).

Renzulli (1994) indicated two reasons which explain why practices that have been a mainstay of gifted programs are being absorbed into general education to improve the performance of all students. The first reason concerns the limited success of remedial-oriented compensatory education programs and practices, and the second reason is the success of practices developed in gifted programs and the need for these practices to be included in the regular curriculum. "All students should have the opportunities to develop higher order thinking skills and to pursue more rigorous content and first-hand investigative activities" (Renzulli, 1993, p. 2). The application of gifted program know-how into general education is supported by a wide variety of research on human abilities (Bloom, 1985; Gardner, 1983; Renzulli, 1986; Sternberg, 1984). This research provides a clear justification for much broader conceptions of talent development, and argues against the restrictive student selection practices that guided identification procedures in the past.

The national report also indicated that although most of these strategies and programs were not exclusively designed for gifted students, they often are not implemented in regular education. The report suggested that the reasons these strategies and programs are not widely implemented may be that general educators do not realize the potential that exists in these opportunities for improving all of American education, and that little research exists to gauge the effectiveness of these programs. This added to the limited research base currently available which assesses the benefits of the extension of gifted education pedagogy to the entire school population.

The Enrichment Clusters

The enrichment clusters consist of non-graded groups of students that share common interests and come together during specially designed time blocks to pursue these interests. A title and description that appeared in a brochure about clusters distributed to parents and students, and a brief commentary about the cluster written by one of the facilitators, is included below to provide further elaboration of enrichment clusters.

Invention Convention

Facilitated by Robert E., physicist and supervisor of teaching labs; Max N., physics student; and Sandra R., third grade teacher at Treatment School B

Are you an inventive thinker? Would you like to be? Brainstorm a problem, try to identify many solutions, and design an invention to solve the problem, as an inventor might give birth to a real invention. Create your invention individually or with a partner under the guidance of Mr. E and his students, who work at the State Science Fair. You may share your final product at the Young Inventors' Fair on March 25th, a statewide day-long celebration of creativity.

Robert E. explains:

When it comes to working with young people, I have a hard time saying no. Young people need to be given the opportunity to reach inside and pull out to create something. I have the expertise in some areas, and I feel I should make use of that and help people. My interest in inventing is from the point of view of a physicist, working with materials. I'm always working on new ways of handling equipment . . . so I'm very much into working with something new, trying to get it to work.

In the Invention Convention cluster, we worked with young people and tried to get them to come up with an idea, express that idea verbally, then be able to put that down on paper and come up with some kind of design. Once they came up with some dimensions and materials they needed, they could begin working to put together a project. In working on a project they had the opportunity to see what might go wrong, what might go right, and they had a chance to work with tools for the first time, and do things they hadn't done before. Each student selected his/her own project. If they weren't quite sure what they were talking about, we would prod them until they had a direction . . . but it was all on their own.

There were two types of products I saw from this cluster—one was the finished product, the physical product they could grab hold of and work with and use. The other was the student's understanding of what it means to take an idea and go all the way to the end, and their realization that it takes more than one try to finish. Students understood how to ask the questions, "What do I do next? What if I did this?"

The most enjoyable thing in working with the cluster was watching the students as they began to dig in, pull out from inside, work towards a project, and see success with that project. Clusters are a superb idea.

Enrichment clusters are organized around unique characteristics of differentiated programming for gifted students including the use of major disciplines, interdisciplinary themes, or cross-disciplinary topics (e.g., a theatrical/television production group that includes actors, writers, technical specialists, and costume designers). Enrichment clusters are modeled after the ways in which knowledge utilization, thinking skills, and interpersonal relations take place in the real world. Thus, all work is directed toward the production of a product or service. No lesson plans or unit plans are provided, rather, direction is provided by three key questions:

1. What do people with an interest in this area (e.g., film making) do?
2. What knowledge, materials, and other resources do they need to do it in an excellent and authentic way?
3. In what ways can a product or service be used to have an impact on an intended audience?

Enrichment clusters are not intended to be the total program for talent development in a school, or to replace existing programs for talented youth, but they are one vehicle for stimulating interests and developing talent potentials across the entire school population. They are also vehicles for professional development in that they provide teachers with an opportunity to participate in enrichment teaching and, subsequently, to analyze and compare this type of teaching with traditional methods of instruction. In this regard, it is hoped that clusters will promote a spill-over effect by encouraging teachers to become better talent scouts and talent developers, and to apply enrichment techniques to regular classroom situations. Enrichment clusters are used by some schools on a one-half day per week basis, and in other schools they meet daily. At the Webster Magnet Elementary School in St. Paul, Minnesota, for example, a broad array of interdisciplinary clusters are offered daily. At the Southeast School in Mansfield, Connecticut, where this idea was piloted, enrichment clusters are offered two afternoons a month, and they are facilitated jointly by teachers and parent volunteers. One of the most popular clusters is called "Flight School," which was organized by the Mansfield, Connecticut Superintendent of Schools, who is a licensed pilot. Each of the two schools in this study offered enrichment clusters for one hour per week for two consecutive 5 or 6 week sessions.

Goals and Objectives

The major goal of this study was to investigate the effects of the use of enrichment program strategies on the entire population of the school, including students, teachers, staff, and parents. Accordingly, one component of enrichment programs, the implementation of enrichment clusters for all students in a school, was the focus of this study. The objectives of the study were as follows:

1. To investigate the strategies which can be used to implement enrichment clusters in a school in which the primary population consists of economically disadvantaged and/or ethnically diverse students.
2. To develop teacher training methods and materials to assist teachers in implementing the clusters.
3. To develop technically sound assessment instruments to measure the outcomes of the implementation of enrichment clusters including parent, teacher, and student attitudes; student products; and the use of enrichment strategies in regular classroom teaching.
4. To assess the impact of these clusters on teacher and parent attitudes toward enrichment learning and teaching, on teachers' perceptions of talent, and also on students' attitudes toward learning and the development of student products.
5. To assess the changes in school climate based on the implementation of enrichment clusters for all students.
6. To disseminate the materials developed for the study and the findings from this study to a wide audience.

Research Design, Methodology, and Treatment

A quasi-experimental design was used in this study to implement enrichment clusters for all students. Two elementary schools were designated as treatment schools for the clusters from two districts in the Northeast. Both districts were urban, culturally diverse, with a concentration of economically disadvantaged students. One district had a minority population of 42.9%, and the other district's minority population of 35% consisted primarily of Hispanic students, many of whom had limited English proficiency. One elementary school in each district implemented the enrichment cluster intervention while another elementary school that was similar in size and ethnicity served as a comparison site. Both quantitative and qualitative methodologies were used for this study. Quantitative methods included descriptive and inferential statistical procedures such as frequency, factor analysis, and multivariate analysis of variance and covariance with repeated measures. These analyses were performed using the SPSS-X software package. In the original proposal, comparison group data were included for the pre and post control group design, however, comparison group data were not used for each question due to low return rates on some of the instruments. To address this concern, we compared our results with the results of the following NRC/GT University of Connecticut site studies: The Classroom Practices Study (Archambault et al., 1993) and The Curriculum Compacting Study (Reis et al., 1993). Qualitative procedures used in this study included: observations, interviews, and questionnaire data gathered through the use of participant observation (Spradley, 1980). Field notes, transcriptions of the interviews, document review, and all other collected data were coded and analyzed for patterns and themes. The coding process used combined techniques described by Spradley (1979, 1980) and by Strauss and Corbin (1990).

To facilitate and conduct the study, a research team was used, consisting of a principal investigator, an on-site research associate, a research analyst, and two on-site research persons whose tasks included program implementation and data collection. Teachers in both treatment schools received training in how to implement enrichment clusters, and each teacher and parent in the school received an invitation to organize a cluster (see Appendix A). A part time (three days each week) enrichment specialist was hired who served as the on-site coordinator and research liaison for both sites. The enrichment specialist developed the intervention strategies and instrumentation, and prepared the dissemination materials.

Each treatment school ran a pilot session of enrichment clusters that met three times before the end of December, 1994. This pilot served as a basis for the development of a more extensive program that ran between January and May, 1995 in both schools. One school ran two six-week sessions and the other ran two five-week sessions. In each school, clusters met weekly, for an hour to an hour and fifteen minutes during a specified, predetermined block of time.

Research Questions

The research questions that guided the implementation of enrichment clusters and the collection and analysis of data for the study were as follows:

1. What are the effects of the implementation of enrichment clusters on students' interests, attitudes about school, and product development?
2. What are the effects of the implementation of enrichment clusters on parental attitudes about school satisfaction?

3. How do teachers differ regarding their attitudes about the use of enrichment activities for students?
4. Do teachers in the experimental sites use strategies learned in organizing enrichment clusters in their regular classroom teaching?
5. How is advanced content used in enrichment clusters?
6. How many students complete products in the enrichment clusters and what is the achievement level of students completing products?
7. Does the quality of student products differ among students of various levels of achievement?

Results

The data analyses were addressed with respect to the categories of program success, student interests, student attitudes, student products, parental attitudes, and teacher practices. The following results were found in this research study:

1. It was possible to successfully implement enrichment clusters in low socioeconomic, culturally diverse urban schools in which these clusters can be adapted and tailored to fit individual school schedules and needs.
2. Both schools which participated in the study plan to continue the program.
3. Both schools served as model sites for other school districts that are considering implementing clusters.
4. Cross-age grouping by interest worked well as a format for building enrichment clusters.
5. The majority of teachers enjoyed facilitating enrichment clusters.
6. Community members were actively involved on a regular basis in schools through enrichment clusters.
7. It was possible to provide a block of time during the school week for enrichment clusters focusing on student and teacher interests, where students have choices, and when there was challenge and enjoyment in learning.
8. Total schoolwide enrichment could be provided and gifted education pedagogy was successfully extended to students of all achievement levels using enrichment clusters.
9. One building was a magnet for over 80 special needs students, and both special education personnel and students were actively and productively involved with enrichment clusters.
10. After enrichment clusters were implemented, students involved in the clusters displayed stronger interests than students not involved in clusters. The experimental group girls showed stronger interests in language arts than the comparison group girls, and the experimental group boys showed stronger interests in math and science than the comparison group boys.
11. Approximately 90% of the students completed group or individual products in clusters, and there were no differences in the number of products produced when examined by achievement, gender, special program placement, or ethnicity.
12. The quality of products was examined and no differences were found among various achievement levels of students with respect to the quality of their products. This suggests that it is not the academic achievement level of the student that is important in product development within the clusters, but rather the level of interest and commitment toward the self-selected enrichment cluster.

13. In both treatment schools parental attitudes about enrichment opportunities improved after the implementation of the enrichment clusters. Parents' perceptions about enrichment and their satisfaction with enrichment increased from the beginning of the year to the end of the year.

14. Teachers who facilitated or assisted with clusters began to use strategies from enrichment clusters in their regular classrooms. These strategies included using both content and methods. Content included such things as the development of centers related to cluster content, the integration of cluster content into the classroom curriculum and lessons, and the use of ideas and community resources gained from the clusters within the classroom. Teaching methods were another area that was influenced by the enrichment clusters. Teachers reported several categories of methodological influences including: attending to student interests, using hands-on activities, allowing for student direction and choices, using interest groups within the classroom, encouraging student products and independent work, and concentrating on thinking skills. Approximately 60% of the teachers said that clusters influenced what they now do in their classrooms.

15. Teachers used advanced content and methodologies in the enrichment clusters and provided challenges and choices to the students. The types of advanced content and the frequency of use are presented in Table 1.

Table 1

Advanced Content and Methodologies by Frequency and Percentage of Use

Strategy	School A	School B	Total
1. Introduction of New Concepts and Advanced Content	52 (91)	62 (98)	114 (95)
2. Development of Product or Service	49 (85)	48 (76)	97 (81)
3. Teaching Specific Methodologies	40 (70)	48 (76)	88 (81)
4. Use of Advanced Vocabulary	39 (68)	39 (62)	78 (65)
5. Use of Authentic "Tools" Related to the Topic	27 (47)	40 (63)	67 (56)
6. Use of Advanced Resources and Reference Materials	25 (44)	38 (60)	63 (53)
7. Use of Advanced Thinking and Problem Solving Strategies	26 (46)	27 (43)	53 (44)
8. Integration of Creative Thinking	24 (42)	27 (43)	51 (43)
9. Integration of Historical Perspectives	14 (24)	15 (24)	29 (24)
10. Development of Presentations or Performances	9 (16)	7 (11)	16 (13)
11. No Advanced Content Used	5 (9)	1 (2)	6 (5)

Note. Numbers in parentheses are percentages

Implications

This research study indicated that pedagogical strategies such as those in Table 1 that are often used in gifted education programs can be extended to students who are not usually included in special programs for talented students. The students who benefited from this research study were from urban areas. Many were poor, had limited English proficiency, and had been repeatedly involved in remedial education programs. In one school, over 80 students were involved in special education programs and were bussed to this school because of its physical accommodations for students with disabilities. During the cluster program in this specially designated time in school, everything changed. Students left their classrooms and in a minute or two sped joyfully down the hallways to another room and another adult, one they had picked because of the topic being covered and the adult offering the cluster. Their evaluations of the program were extremely positive, and indicated that enrichment clusters fostered excitement about learning and demonstrated the benefits of schoolwide enrichment for all students.

It should be noted that this cluster program was organized with minimum effort and minimal costs, and that the greatest challenge to implementing the program was finding a common block of time for all teachers and students to be able to participate in the program.

Most teachers genuinely seemed to enjoy facilitating the clusters and they did not seem to regard it as just another preparation. Interviews indicated that the teachers looked forward to having an opportunity to share their interests with students who have similar interests and learning styles. These observations are further reinforced by the fact that both of the faculties from the treatment schools elected to continue the enrichment cluster programs.

The implementation of the cluster program also resulted in the recruitment of many parents and community members into the school in roles that many of them had not previously been involved in pursuing. Many parents who coordinated or assisted in a cluster had either not been active in the school before or had simply helped in clerical roles or as a baker, driver, or stapler. Involvement with the cluster program allowed parents to share talents, areas of expertise, hobbies and special abilities; and many of them were excited and delighted to be able to have their children's teachers know them in a different way. The same was true for many community members who facilitated clusters. Several of them had not had opportunities like this before and were pleased to bring their special talents into the school. It was exciting to observe the community involvement from churches, clubs, service organizations, and other associations.

The measures used to assess parents' enthusiasm and parental attitudes about enrichment demonstrated significant gains from the beginning of the school year to the end of the period after the implementation of the cluster program. Letters, notes, phone calls, and communication with teachers and researchers all indicated the success of the program. Parents often called and indicated that although their child was ill, he/she would not stay home from school on a cluster day.

The urban schools that implemented this program served as models for other schools that were interested in implementing the cluster program, or various components of schoolwide enrichment. Due to professional development opportunities that were presented by the NRC/GT staff throughout the geographic area and reports in area newspapers, news of the cluster program spread and similar programs were implemented in other schools. At least seven districts that visited these pilot schools modeled their new cluster program on visits to the two urban districts that participated in this research.

As mentioned earlier, the implementation of enrichment clusters also affected teachers' use of enrichment strategies and their use of advanced content. The use of advanced content in their enrichment clusters was a byproduct of the nature of clusters, the opportunity to delve into advanced issues and content based on the mutual interests of both children and adults. For example, the introduction of new concepts and advanced content by 95% of the cluster facilitators was both gratifying and somewhat expected, given the design of the clusters, but the addition of a number of other strategies for providing advanced opportunities was greater than we had hoped for or expected. These included (in decreasing frequency of use) the development of a product or service by the facilitators; the teaching of specific, authentic methodologies; the use of advanced vocabulary; the use of authentic "tools" related to the topic; the use of advanced resources and reference materials; the use of advanced thinking and problem solving strategies; the integration of creative thinking and historical perspectives; and the development of presentations or performances. It would appear that, given the frequency with which these advanced strategies were used within the clusters, some transference would occur from cluster to classroom, and that is exactly what we found in our interviews with teachers, cluster evaluations, and in our observations. Many teachers reported that they began using the strategies that they used in their clusters in their classrooms. It appears that some of the standard differentiation strategies such as those shown in Table 1 that are advocated in gifted education can be used by classroom teachers who have received opportunities to use these strategies in a situation like clusters. This professional development opportunity was also clearly demonstrated in the continued improvement of cluster content and offerings. The more time that teachers had to work on their clusters and to experiment with this more inductive way to teach, the more advanced the content and the more diverse the products and services became. Based on previous findings of Classroom Practices Studies by Archambault et al. (1993) and Westberg et al. (1993), it would appear that the opportunity to teach in a cluster program may result in much higher levels of use of differentiation strategies by classroom teachers in their own classroom teaching situations. The implementation of enrichment clusters may then provide a dual opportunity: high-end learning opportunities for all children, professional development for teachers in differentiation strategies, and enrichment learning and teaching.

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Extending the Pedagogy of Gifted Education to All Students

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CHAPTER 1: Introduction

This report contains four chapters. The first chapter presents an overview of the research study. Chapter 2 includes a review of the related literature and research which forms the basis of the study. In Chapter 3, the methods and procedures used to conduct the study are explained as are the results of the study. Finally, in Chapter 4, findings and implications are discussed with the significance of this study.

Rationale

During the 1994-95 school year, the University of Connecticut site of The National Research Center on the Gifted and Talented (NRC/GT) conducted a study to examine the effects of implementing an innovation called enrichment clusters with all students. Enrichment clusters facilitate the use of some pedagogical strategies in the field of gifted education, but they are designed to deliver enrichment to all students during a specified time of the school week. For the past twenty years, gifted education programs have "served as laboratories for innovative and experimental approaches to teaching and learning" (U.S. Department of Education, 1993, p. 23). The Office of Educational Research and Improvement national report entitled *National Excellence: A Case for Developing America's Talent* (1993), cites numerous innovative instructional contributions from gifted programs including the teaching of complex thinking strategies and problem solving, and the use of pedagogical strategies such as those used in the Padeia Program, Philosophy for Children, and Great Books. The national report also indicates that, although most of these strategies and programs were not exclusively designed for gifted students, they often are not implemented in regular education. The report suggests that the reasons these strategies and programs are not widely implemented may be that general educators do not realize the potential that exists in these opportunities for improving American education, and that little research has been conducted to gauge the effectiveness of these programs. This study adds to the limited research base currently available which assesses the benefits of the extension of gifted education pedagogy to the entire school population.

The Enrichment Clusters

The enrichment clusters are non-graded groups of students that share common interests, and who come together during specially designed time blocks to pursue these interests. They are organized around unique characteristics of differentiated programming for gifted students including the use of major disciplines, interdisciplinary themes, or cross-disciplinary topics (e.g., a theatrical/television production group that includes actors, writers, technical specialists, costume designers). The clusters are modeled after the ways in which knowledge utilization, thinking skills, and interpersonal relations take place in the real world. Thus, all work is directed toward the production of a product or service. No lesson plans or unit plans are provided, rather, direction is provided by three key questions:

1. What do people with an interest in this area (e.g., film making) do?
2. What knowledge, materials, and other resources do they need to do it in an excellent and authentic way?
3. In what ways can our product or service be used to have an impact on an intended audience?

A sample description of an enrichment cluster facilitated by a teacher at one of our treatment sites is included below with his comments taken directly from an audiotaped interview about this cluster. It provides an excellent example of what an enrichment cluster is and what can develop in a cluster program.

History of the Motion Picture

Facilitated by Richard L., Teacher and film enthusiast, Treatment School A

Explore the world of movies and film makers. Students will be introduced to the first motion picture, *The Great Train Robbery*, silent pictures and the great influences of the era. They will also pursue an in-depth study of specific film genres, such as horror, comedy or sci-fi. Richard is a fourth grade teacher who is fascinated with the Golden Age of Hollywood. Students in this cluster work on film reviews for the student body and are encouraged to create their own film posters.

Richard L. begins his cluster with a horror movie. Students approached him in the hall before clusters even began to request the horror genre within films. With the limited amount of time for the cluster, students are only able to sample many of the thousands of titles Mr. L wanted to introduce. Students are able to borrow the videotapes, take them home and share them with their friends and family. They are encouraged to share their opinions and to compare the old films with current movies. Mr. L has created a section devoted to the history of film in the library so students can pursue their interest even further. Mr. L explains:

> What happens when you teach any kind of cluster is that you're going to have a cross section of kids with all kinds of skills in all different kinds of areas. So I've found out there are some kids who would really enjoy using their writing skills and they can write reviews; they love to be critics. We have kids who are very artistic and they can lend their artistic talents to producing posters and the great thing about this is that they have not seen the original movie posters. I would also like to see the kids create monsters from some of the movies and possibly backdrops or dioramas, which then, once the kids have those skills, can be incorporated into the regular classroom when they read novels and do book sharing projects. So, really there is no limit and I'm going to let it go as far as the kids want it to go; because as I go along, I find out there's more that I'm learning and new possibilities can open up.

Enrichment clusters are not intended to be the total program for talent development in a school, or to replace existing programs for talented youth, but they are one vehicle for stimulating interests and developing talent potentials across the entire school population. They are also vehicles for professional development in that they provide teachers with an opportunity to participate in enrichment teaching and, subsequently, to analyze and compare this type of teaching with traditional methods of instruction. In this regard, it is hoped that clusters will promote a spill-over effect by encouraging teachers to become better talent scouts and talent developers, and to apply enrichment techniques to regular classroom situations. Enrichment clusters are used by some schools on a one-half day per week basis, and in other schools they meet daily. At the Webster Magnet Elementary School in St. Paul, Minnesota, for example, a broad array of interdisciplinary clusters are offered daily. At the Southeast School in Mansfield, Connecticut where this idea was piloted, enrichment clusters are offered two afternoons a month, and they are facilitated jointly by teachers and parent volunteers. One of the most popular clusters is called "Flight School," which was organized by the Mansfield, Connecticut Superintendent of Schools who is a licensed pilot. Each of the two schools in this study offered enrichment clusters for one hour per week for two consecutive 5 or 6 week sessions.

Goals and Objectives

The major goal of this study was to investigate the effects of the use of enrichment program strategies on the entire population of the school, including students, teachers, staff, and parents. Accordingly, one component of enrichment programs, the implementation of enrichment clusters for all students in a school, was the focus of this study. The objectives of the study were as follows:

1. To investigate the strategies which can be used to implement enrichment clusters in a school in which the primary population consists of economically disadvantaged and/or ethnically diverse students.
2. To develop teacher training methods and materials to assist teachers in implementing the clusters.
3. To develop technically sound assessment instruments to measure the outcomes of the implementation of enrichment clusters including parent, teacher, and student attitudes; student products; and the use of enrichment strategies in regular classroom teaching.
4. To assess the impact of these clusters on teacher and parent attitudes toward enrichment learning and teaching, on teachers' perceptions of talent, and also on students' attitudes toward learning and the development of student products.
5. To assess the changes in school climate based on the implementation of enrichment clusters for all students.
6. To disseminate the materials developed for the study and the findings from this study to a wide audience.

Research Design, Methodology, and Treatment

A quasi-experimental design was used in this study to implement enrichment clusters for all students. Two elementary schools were designated as treatment schools for the clusters from two districts in the Northeast. Both districts were considered urban, culturally diverse, and contained a high concentration of economically disadvantaged students. One district had a minority population of 42.9%, and the other district's minority population of 35% consisted primarily of Hispanic students, many of whom had limited English proficiency. One elementary school in each district implemented the enrichment cluster intervention while a second elementary school served as a comparison site. Both quantitative and qualitative methodology were used to examine and describe the impact of the interventions on classroom teachers, students, and parents.

To facilitate and conduct the study, a research team was used. The team consisted of a principal investigator, an on-site research associate, a research analyst, and two on-site research persons whose tasks included program implementation and data collection. Teachers in both treatment schools received training in how to implement enrichment clusters, and each teacher and parent in the school received an invitation to organize a cluster. A part time (three days each week) enrichment specialist was hired who served as the on-site coordinator and research liaison for both sites. The enrichment specialist developed the intervention strategies, instrumentation, and prepared the dissemination materials.

Each treatment school ran a pilot session of enrichment clusters that met three times before the end of December, 1994. This pilot served as a basis for the development of a more extensive program that ran between January and May 1995 in both schools. One school ran two six-week sessions and the other ran two five-week sessions. In each school, clusters met weekly, for an hour to an hour and fifteen minutes during a specified, predetermined block of time.

Research Questions

The research questions that guided the implementation of enrichment clusters and the collection and analysis of data for the study were as follows:

1. What are the effects of the implementation of enrichment clusters on students' interests, attitudes about school, and product development?
2. What are the effects of the implementation of enrichment clusters on parental attitudes about school satisfaction?
3. How do teachers differ regarding their attitudes about the use of enrichment activities for students?
4. Do teachers in the experimental sites use strategies learned in organizing enrichment clusters in their regular classroom teaching?
5. How is advanced content used in enrichment clusters?
6. How many students complete products in the enrichment clusters and what is the achievement level of students completing products?
7. Does the quality of student products differ among students of various levels of achievement?

Significance of the Current Research Study

"Many educators believe that the knowledge and experience that gifted education has gained . . . can be used to upgrade all of education and are calling for this to be done" (U.S. Department of Education, 1993, p. 23). Although educators have suggested the use of gifted program pedagogy as a way to improve schools for all children, very little research exists on whether this suggestion can actually be implemented. To what extent can interest-based, open-ended, thematic clusters benefit all students? In what ways must adaptations be made to gifted program strategies such as enrichment clusters to make them meaningful and appropriate for all children? How much advanced content can be introduced when these opportunities are made available to all interested students? Do these opportunities have an impact on children's love of learning and interest in school? Can parental attitudes about school be changed by the implementation of enrichment clusters? And most important, can we develop a plan for implementing these strategies that is extremely cost effective and which can easily be used by other schools with ethnically diverse populations and economically disadvantaged students? If so, then the potential significance of this research study may be far-reaching.

As the federal report, *National Excellence: A Case for Developing America's Talent* (U.S. Department of Education, 1993), states: "Over the past 20 years, while the regular school program focused on basic skills and minimum standards, programs for gifted and talented students served as laboratories for innovative and experimental approaches to teaching and learning" (p. 23). The report further called for the improvement of education for *all* of America's students. This study of the implementation of gifted education pedagogy through enrichment clusters in two urban schools with ethnically diverse populations of economically disadvantaged students provides insight into an area which has not often been investigated.

CHAPTER 2: Review of the Related Literature

Many researchers, policymakers, and educators have called for the use of gifted education "know-how" with all students as a means of improving general education (Bloom, 1985; Goodlad, 1984; Hopfenberg & Levin, 1993; Renzulli, 1994; Renzulli & Reis, 1985; Schlichter, 1986; Slavin, 1984; Tomlinson & Callahan, 1992; U.S. Department of Education, 1993; Williams, 1986). In his Multiple Menu Model for developing differentiated curriculum for gifted and talented students, Renzulli (1988) reviews and suggests a number of pedagogical strategies. These strategies include: recitation and drill, peer tutoring, programmed instruction, and lecture and discussion, as well as more innovative strategies such as guided independent study or exploration, learning center activities, simulation, role playing dramatization, guided fantasy, learning games, replicative and investigative reports and projects, unguided independent study, and, finally, internships or apprenticeships. These innovative strategies are often the basis of gifted education pedagogy and of enrichment clusters. The implementation of enrichment clusters (Renzulli, 1994) is a means by which pedagogical strategies commonly used in gifted education can be extended to the entire student population.

The federal report, *National Excellence: A Case for Developing America's Talent* (U.S. Department of Education, 1993), includes the following goals: provide more challenging opportunities to learn, increase learning opportunities for disadvantaged and minority children with outstanding talents, broaden the definition of gifted, and emphasize teacher development. This report emphasized the role gifted education programs have had on general education:

> Over the past 20 years, while the regular school program focused on basic skills and minimum standards, programs for gifted and talented students served as laboratories for innovative and experimental approaches to teaching and learning. A variety of educational options were developed in programming and scheduling. Many new programs focused on complex thinking strategies and problem solving and used sophisticated teaching strategies . . . developed alternative teaching strategies and interesting curriculum approaches . . . . Now many educators believe that the knowledge and experience that gifted education has gained . . . can be used to upgrade all of education and are calling for this to be done. (p. 23)

The report further called for the improvement of education for *all* of America's students and stated that schools must:

- Expand effective education programs and incorporate more advanced materials into the regular school program;
- Provide all students with opportunities to solve problems, analyze materials and situations, and learn from real-life experiences;
- Serve students identified as having outstanding talent in many places—the regular classroom, a special class, the community, at a university or a museum, in front of a computer, or anywhere the opportunity meets the need;
- Create flexible schools that enable all students, including the most able, to be grouped and regrouped according to their needs and interests. (p. 14)

Enrichment clusters meet these challenges as they are designed to offer all students an opportunity for challenging, self-selected, real world learning experiences. Within clusters, students are grouped by interests and focused toward the production of a real world product or service. Gifted programs have developed an impressive menu of curricular adaptations, independent study, and thinking skill strategies that can be used to improve education for all students (Renzulli, 1994; Renzulli & Reis, 1991; Tomlinson & Callahan, 1992; U.S. Department of Education, 1993). Tomlinson and Callahan (1992) cite several contributions of gifted education to general education including:

1. Expanded views of intelligence (Gardner, 1983; Guilford, 1967; Reis & Renzulli, 1982; Renzulli, 1978; Sternberg, 1985, 1991);
2. Attention to underserved populations (Baldwin, 1985; Callahan, 1986; Frasier, 1989; Torrance, 1977; Whitmore, 1980);
3. Instructional techniques (Brandwein, 1981; Maker, 1982; Passow, 1982; Renzulli, 1977; VanTassel-Baska, 1988; Ward, 1980);
4. Differentiation of content, process, and product as well as theme-based learning (Kaplan, 1986), self-directed learning (Treffinger, 1986), and student productivity (Renzulli, 1977);
5. Individualization (Benbow, 1986; Renzulli & Smith, 1979);
6. Teaching models (Feldhusen & Kolloff, 1986; Kaplan, 1986; Renzulli, 1977; Renzulli & Reis, 1985; Schlichter, 1986; Taylor, 1986).

Renzulli (1994) believes that two reasons explain why practices that have been a mainstay of gifted programs are being absorbed into general education to upgrade the performance of all students. The first reason concerns the limited success of remedial-oriented compensatory education programs and practices, and the second reason is the success of practices developed in gifted programs and the need for these practices to be included in the regular curriculum. "All students should have the opportunities to develop higher order thinking skills and to pursue more rigorous content and first-hand investigative activities" (Renzulli, 1993, p. 2). The application of gifted program know-how into general education is supported by a wide variety of research on human abilities (Bloom, 1985; Gardner, 1983; Renzulli, 1986; Sternberg, 1984). This research provides a clear justification for much broader conceptions of talent development, and argues against the restrictive student selection practices that guided identification procedures in the past.

Treffinger (1991) suggested a shift in the paradigm regarding giftedness by broadening the definition and linking with general education by suggesting that powerful learning and thinking tools can be learned and applied successfully by all students and which enables "many students to become more successful and more creatively productive than would have been predicted on the basis of test scores or prior achievement" (p. 445). Recently, Passow, Mönks, and Heller (1993) suggested that issues concerning the field of gifted education "have never been confined to a small group of children and youth identified as 'gifted or talented' but have an impact on the whole of education" (p. 883). Jackson (1993) agreed, citing the need for efforts to increase connections between studies of giftedness and mainstream educational research because studies of giftedness influence mainstream theory. In his landmark work, *Developing Talent in Young People*, Bloom (1985) found that expectations, education, and family played key roles in development of talent, and further indicated that each society could greatly increase the amount and types of talent it develops. Ellis and Ellis-Schawabe (1986) also advocated that participation in enrichment should be more broadly conceived and recommended programs where content is matched to individual interests and needs, and where teaching is done through facilitation and instructional guidance. Enrichment opportunities should not just be provided for gifted and talented students. Pasch, Langer, Gardner, Starko, and Moody (1995) suggest that the following pedagogical strategies generally associated with gifted education (Renzulli, 1977; Renzulli & Reis, 1985) are successful classroom practices for elementary teachers: identifying a real problem, solving it, and producing information related to it; inquiry lessons; using centers to develop and stimulate student interests; and using authentic research and methodologies with students. In a national study which examined the status of programs for high-ability students, Purcell (1993) found that a gifted program in a school can influence pedagogy in that school. Her research indicated that when gifted programs are eliminated, adverse effects result for all children and teachers within the school.

Little research has been conducted on what occurs when gifted program techniques are infused into regular education classrooms. Reis and Renzulli (1982) found that when services such as thinking skills training and independent study are provided to an expanded number of students (15-20% of the general population), no differences were found in the quality of student products between students who were traditionally identified as gifted (students who score in the top one to three percent on achievement tests) as opposed to students who score in the next 15-20 percent. Olenchak and Renzulli (1989) investigated the effectiveness of using a gifted education model on schoolwide change and found favorable results on the use of the Schoolwide Enrichment Model (Renzulli & Reis, 1985) including:

> . . . remarkably favorable changes in attitudes toward education of the gifted on the part of classroom teachers and the general student population, large increases in student-centered enrichment activities and work on self-selected interests, greater cooperation between classroom teachers and gifted education specialists, and more favorable attitudes toward special programming on the part of parents. (Olenchak & Renzulli, 1989, p. 36)

In the same study, positive changes were also found in student and teacher attitudes and numerous student products which exceeded the norm of typical student creative output.

Baum, Renzulli, and Hébert (1994) also investigated the use of gifted education strategies, specifically the use of a student-directed project approach, with underachieving gifted students and reported favorable results. This finding was supported by Olenchak (1995) in his study of the effects of enrichment on learning-disabled gifted students. He found that year long participation in a personalized enrichment program had positive impacts on students' attitudes toward school, self concept, and creative production. New model projects funded under the Jacob Javits Act also explored the impact of gifted program strategies used with a wider range of students. However, there were few data-based studies.

Teaching and Learning Reforms in General Education

Educational reform has called for changes in teaching and learning for some time, yet evidence exists that very little has changed for students in school. Despite frequent criticism and cries for reform, whole-class instruction with recitation and seat work has existed as the dominant approach to public school instruction since it first became established (Cuban, 1984, Good & Brophy, 1987; Goodlad, 1984, Grinder & Nelson, 1985). In his national study of schools, Goodlad (1984) reported a limited variety in pedagogy and further asserted that good pedagogy was seldom used. Based on teacher and student reports as well as observations, Goodlad presented a picture of total group instruction, with the teacher as the central figure determining both the activities and tone of the classroom, and a narrow range of classroom activities that included listening to the teacher, writing answers, working at desks and taking tests and quizzes. He states:

> Only rarely did we find evidence to suggest instruction likely to go much beyond mere possession of information to a level of understanding its implications and either applying it or exploring its possible applications. Nor did we see activities likely to arouse students' curiosity or to involve them in seeking solutions to some problem not already laid bare by teacher or textbook. (p. 236)

In their research, Grinder and Nelson (1985) found that adapting instruction to individual differences occurs infrequently due to pressures such as class size, age differences, availability of curricular materials, and cost efficiency. Instead, students are moved through an inflexible, lock-step curriculum—at the same pace, using the same materials, and the same whole group instruction.

Archambault et al. (1993) investigated the classroom practices of a national sample of 1018 public school elementary teachers. Teachers responded to a survey and reported activities that occurred in their classrooms for both gifted and average students. This study provided extraordinary insights into what teachers say they do in their classrooms. Little differentiation occurred for gifted students, but of interest here is what the teachers reported that they did for average students. Additionally, this study revealed how infrequently teachers provided challenges and choices to both average and gifted student with each group receiving a rating of less than a few times a month. A follow-up observation study (Westberg et al., 1993) corroborated these findings. This study found that within all activities, across five subject areas during 92 observation days, in 84% of the activities no differentiation provided for gifted students. The gifted students received the same content, same instruction, and the same activities as all students. Further, the researchers reported that many of the activities were not high quality or challenging. As in Goodlad's (1984) findings, this study found the major pedagogical strategies used by teachers to be lecture/explain, review, written assignments, and reading. Both Goodlad and Westberg et al. noted discrepancies between desired pedagogy and actual pedagogical practices in schools. In a recent book, New York State teacher of the year John Taylor Gatto (1992) contrasts what happens in schools as compared to what should happen when he described the regimented, directed state of most classrooms and compares this with the ingredients of choice, personal meaning, and community service, which he suggests are crucial for excellence and quality in education.

The national report, *A Nation at Risk* (National Commission on Excellence in Education, 1983) alerted the United States to the poor performance of American students when compared with students from other developed countries. Then, ten years later, *National Excellence: A Case for Developing America's Talent* (U.S. Department of Education, 1993) documented that the highest achieving American students fare poorly when compared with similar students in other nations and only a small percentage of students are prepared for challenging college-level work. Good and Brophy (1987) suggested that brighter students who master the curriculum more quickly should receive more enrichment or accelerated pacing and slower students should be given extra instruction. They go on to recommend that "all students should have the opportunity to explore strengths and interests and experience success" (p. 353). The U.S. Department of Education report, *National Excellence: A Case for Developing America's Talent* (1993), cited two major implications of unchallenging standards in American education:

> We know that high expectations produce higher achievement. Yet our expectations for most American students remain at minimum levels of academic competency. We fail to provide opportunities for students to perform at high levels and then lament that few of our youngsters excel. (p. 14)

> Only a challenging educational environment that elevates standards for everyone can create the schools our students need to take their places in tomorrow's world raising the ceiling of expectations for all students, providing challenging opportunities for students with outstanding talent—herein lies the key to better schools. (p. 14)

It is clear that a discrepancy exists between what takes place in schools for students with regard to challenge and instructional strategies and what should take place if American students are to compete in a global market place. To explore how the pedagogical strategies of gifted education may be extended to all students, an attempt was made in this study to determine if strategies that work with gifted students in a special program also work with all students in an innovative setting such as enrichment clusters. If so, then perhaps some of those same strategies can be used in general education.

Pedagogical Foundation of Enrichment Clusters

Learning can be enhanced if schools provide challenging, meaningful, and interesting educational experiences in which students are afforded choices in an enjoyable environment. Enrichment opportunities that contribute to student learning include choice and enjoyment. Renzulli (1994) stated that, "We know that all learning improves when schools are perceived as being enjoyable, relevant, friendly places where students have some role . . . deciding what they will learn, and how they will pursue topics in which they may have a special interest" (pp. 20-21). In the sections that follow, the pedagogy related to challenge, meaningfulness, interest, choice, and enjoyment is discussed. Finally, the pedagogy associated with product development is reviewed.

Challenge

The pedagogy related to providing challenge includes: presenting high level content, using advanced thinking skills, using advanced and authentic methodologies, developing products or services for a real audience, and compacting curriculum (Bloom, 1985; Reis et al, 1993; Renzulli, 1994; Schlichter, 1986; Treffinger, 1986; U.S. Department of Education, 1993). Challenge is an important part of gifted education and should be an integral part of general education, paving the way toward excellence. Recent literature suggests the importance of challenge in education. In the federal report, *National Excellence: A Case for Developing America's Talent* (U.S. Department of Education, 1993), the need was established for more challenging curriculum standards and for providing students with more challenging opportunities to learn. In this report it was suggested that the regular curriculum is often not challenging for students. A national study on curriculum compacting (Reis et al., 1993) also provided compelling evidence about the need for increased levels of challenge. Compacting is a pedagogical strategy that enables teachers to target students who already know some of the content, eliminate what the students already know, and replace it with more challenging work. In this study, conducted at the NRC/GT, researchers found that for students who were targeted for compacting, eliminating 40%-50% of their curriculum had no adverse affects on achievement test results. In some curricular areas, students whose curriculum was compacted outperformed those students on achievement tests whose curriculum was not compacted. This provides support for the elimination of repetitive, dull curriculum and its replacement with more challenging and interesting educational opportunities.

Vygotsky (1962) supported the notion of challenge in his theory about the zone of proximal development, in which he asserted that the only good instruction is that which proceeds slightly ahead of development. Rogers (1991), in a meta-analysis on ability grouping, examined grouping arrangements, the implications of grouping, and the possible effects of activities within various groups on student achievement. Her results supported the importance of challenging all students to enable them to reach their potentials. Additionally, Oakes (1985) and Slavin (1987), in their studies of tracking and ability grouping, discussed how achievement in low ability grouped classes declined due to lack of challenging and interesting curriculum. It is important to recognize that, whether students are grouped by ability or not, challenge is necessary for students to achieve.

In his work on developing talent mentioned earlier, Bloom (1985) studied 25 outstanding individuals in each of 6 fields after they had attained high levels of success at relatively young ages. Bloom's findings provide strong evidence for the importance of challenge as an element in talent development. In this study, he found repeated accounts of high levels of challenging and demanding instruction by their teachers. Shore, Cornell, Robinson, and Ward (1991) reviewed research in their book, *Recommended Practices in Gifted Education: A Critical Analysis,* and discussed challenge levels as a critical feature of programming within the field of gifted education, recommending that tasks be challenging but not frustrating. Providing students "how-to" knowledge and skills are essential in helping students experience success within challenging curricula and activities.

Instruction which incorporates the strategies mentioned above and which is slightly above one's current achievement level would provide challenge to students, yet recent research continues to find that challenge is absent in many of America's classrooms (Archambault et al., 1993; Westberg et al., 1993). Additionally, Goodlad (1984) studied classrooms in schools in 39 communities across the country, reporting the results in a book, *A Place Called School,* in which he provides a detailed account of his observations. His findings were discouraging as he observed only rare instances in which "instruction moved beyond mere possession of information to a level of understanding its implications and either applying it or exploring its possible applications" (p. 236). Goodlad further reported that hands-on projects in classrooms were rare, and when they did occur their use was often for basic skills rather than for "fresh intellectual challenge" (p. 239). Coupled with his findings of the absence of varied instructional strategies, these observations clearly indicated that while it is needed, challenge is uncommon in classrooms. As Goodlad (1984) stated, "Only rarely does one find a teacher who has abandoned lectures, quizzes, textbooks and workbooks in favor of learning organized almost exclusively around observations of things outside of schools, projects requiring small group collaboration and primary documents . . ." (p 256).

Challenge should be evident in good educational practices. It is an integral part of enrichment clusters through the use of advanced level content and methodologies, and through the development of authentic products and services as an outcome of involvement in an enrichment cluster.

Meaningfulness

Theorists have long recognized the role of prior knowledge and personal meaning in learning. In *Realms of Meaning,* for example, Phenix (1964) suggested that for learning to be optimal, topics must be relevant, meaningful, and interesting to the child and have an appeal to the child's imagination. Goodlad (1984), following his research in schools, stressed the importance of relevance of school to the lives of students. Unfortunately, however, he reported that students ". . . do not often get involved in projects where they and their classmates set and achieve goals that are important to them" (p. 192). In their account of how talent is developed in America, Durden and Tangherlini (1993) stressed that by providing opportunities for young people to explore, in depth, the fields where they show the greatest talent and interest, educators can provide personal meaning for students which, in turn will connect students to their own education. Enrichment clusters can provide such an opportunity to all students. When students view education as meaningful to them, learning becomes both authentic and intrinsic.

The pedagogy of providing meaningfulness in education includes providing a format for students to explore and develop topics and products that are personally meaningful. This can be done through self-directed learning and by helping students connect learning to their personal interests. Supporting the work of Torrance (1962), Feldman (1986) discussed meaningfulness in education, stating that, "The opportunity to become engaged—to fall in love—with a field (of study) must be afforded a child" (p. 95). If a child loves a field of study, then learning becomes personally meaningful for the child. After 20 years of working on schoolwide enrichment and strategies for developing talent in students, Renzulli (1994), in *Schools for Talent Development: A Comprehensive Plan for Total School Improvement,* discussed at length how personal meaning and relevance of information help students construct knowledge and learn. He advocates offering opportunities for students to conduct individual or small group investigations as a means for providing personally meaningful educational experiences. In the instructional strategies menu from the Multiple Menu Model (1988) for developing curriculum, Renzulli suggests three strategies that assist with investigations of guided independent study, learning centers, and investigative reports or projects. Reis and Cellerino (1983), writing about the specific strategy of self-directed learning, revealed its rewards by reporting that "students begin to understand the process of their own learning, become more self-directed rather that teacher-directed, realize they can indeed have a significant impact on their own learning and, finally, produce a product of excellence" (p.138).

Slavin, Madden, Dolan, and Wasik (1994) described a program called "Roots and Wings" to help disadvantaged children succeed in elementary school. This program emphasized the need for meaning and connectedness within curriculum and instruction. "Motivation, curiosity and insight are certain to be much greater when children need information or skills to solve problems that are meaningful to them" (Slavin et al., 1994, p. 11).

Interest

The pedagogy of encouraging student interests includes the use of interest assessments and the provision of enrichment experiences to determine a child's areas of interest, followed by in-depth learning experiences within those areas of identified interest (Renzulli & Reis, 1985). Enrichment clusters follow this sequence, while emphasizing the student directed nature of the learning experiences (Renzulli, 1994). Interest has long been a concern of educators. Over a century ago, William James (1890) proposed that awakening and nurturing children's interests are central to learning. Later, Dewey (1913) suggested that education needed to draw out the abilities and interests of the child, indicating that "to be interested is to be absorbed in, wrapped up in, carried away by, some object" (p. 16). Interest is a powerful motivator for students and, if nurtured, can lead a child to great personal and educational accomplishments. Gruber (1986), in describing his view of giftedness in the book *Conceptions of Giftedness* (Sternberg & Davidson, 1986), argued that the main force in the self-construction of the extraordinary is a person's own activities and interests. As a developmentalist, Gruber viewed giftedness as a lifetime possibility and learned about its manifestation by looking at adults who had transformed their "gift" into what he called creativity, which used the individual's interests and talents. Educators from the field of gifted education have called for interest to be central in determining a child's educational program (Gallagher, 1985; Maker, 1982; Parke, 1989; Passow, 1982; Renzulli, 1978; Ward, 1980). Further study of interests can lead to insights regarding learning and motivation. Deci and Ryan (1985) addressed the issue of interest as related to intrinsic motivation and self-determination. They suggested that because people enjoy tasks that interest them, studying interests can lead to an understanding of motivation and learning.

In a review of recent research related to the concept of interest, Schiefele (1991) discussed the role of interest in learning and motivation, pointing out that people naturally approach activities that interest them, making interest a directive force. He suggested that adapting instruction to student interests may have positive motivational effects for long periods of time. Further, he reported the results of three studies which compared reading comprehension of high- and low-interest subjects. The findings in these three studies caused him to conclude that interests motivate the reader to go beyond the text's surface and to try to understand its meaning and main ideas. Tobias (1994) also investigated the role of interest on learning and reported that interest has an energizing effect on learning and leads to a deep comprehension of subjects. He suggested that prior knowledge plays a significant role in interest, thereby adding support to the idea that students need exposure to a wide variety of content and enrichment in order to develop interests. Unfortunately, Goodlad (1984) reported that activities likely to arouse student curiosity or to involve him/her in seeking solutions to problems were rarely observed in the classrooms of his research.

In their work addressing individual differences among students, Wang and Lindvall (1984) recommended adaptive educational approaches which include procedures allowing progress suited to a student's individual interests and abilities. Renzulli (1977, 1982, 1994) suggested that learning experiences be developed based on individual differences and interests. However, grade-level grouping, which pervades America's schools, does not facilitate addressing students' interests. Grouping arrangements, such as those commonly seen in gifted education, offer a means by which individual students can work with peers who share common interests. For example, in a book addressing the needs of gifted students in regular classrooms, Parke (1989) identified multi-age and interest groups as desirable for use with gifted students. Other researchers suggest that grouping according to ability or interest, in class or across classes, is beneficial in meeting the academic needs of gifted students (Begle, 1975; Gamoran, 1990; Keating, 1976; Kulik & Kulik, 1984; Rogers, 1991). In his discussion of adapting instruction to individual differences, Slavin (1984) suggested that for instruction to be effective students must be motivated. Since interest is a motivator, grouping students on the basis of common interests could serve to enrich students' desire to learn.

The use of student interest is common in the field of gifted education when planning educational experiences, yet general education relies more heavily on prescribed curriculum. Extending the use of student interests as a basis for learning has powerful implications for improving the education of all students. As Good and Brophy (1987) suggested, all students, regardless of their achievement levels or background, should have the opportunity to explore strengths and interests and experience success. The innovation of enrichment clusters provides schools a format for regularly scheduling such opportunities for students during which students can explore and develop their individual interests. Enrichment clusters extend the use of student interests as a basis of programs for gifted and talented to a foundation for providing personally meaningful enrichment to all students.

Choice

The pedagogy of providing student choice involves affording the child choice within his/her educational activities including selecting enrichment activities, determining products or services, and deciding with whom, if anyone, to work. Like interest, choice is a powerful motivator and has been often recommended (Bloom, 1985; Dewey, 1913, 1916; Goodlad, 1984; Holt, 1983; Renzulli & Reis, 1985; Shore et al., 1991; Wang & Lindvall, 1984). As early as 1976, Ruth Martinson indicated, "The independence, ability, interests, and initiative of the gifted underscore the right of the gifted to play a major role in the determination of their learning agenda" (p. 65). Programs for gifted students are often constructed around student choices, while general education programs are historically driven by curriculum.

In addressing the controversial issue in education of whether schools should determine what is learned, Phenix (1964) suggested that young people control their learning by deciding what, when, and how they learn. Other theorists concur. When recommending practices for gifted education, Shore et al. suggested broad curricular choices for students related to inquiry, discovery, and problem solving. Renzulli (1994) advocated that students should be given a choice regarding some of their educational activities, suggesting that attention be given to opportunities to personalize student choice in problem selection. He also suggested that when students are grouped together by common interests and focused toward the development of an authentic product or service (as they might be in an enrichment cluster), students choose the tasks that meet their strengths and talents. Gardner (1991) concurred, suggesting that, in an effort to fully develop more individual potentials, schools should offer choices to students that address areas of intelligence beyond those of logical-mathematical and linguistic. Wang and Lindvall advocated student choice in selecting educational goals, outcomes, and activities. With regard to grouping assignments, Rogers (1991), in her analysis of grouping, and Robinson (1991), in her review of research on cooperative learning, concluded that students should be given choices regarding group assignments and whether they work alone or with others.

Goodlad found few opportunities for student choices; instead, he reported that the teacher is central in determining activities of the classroom, and found a narrow range of classroom activities which include listening to teachers, writing answers, and taking quizzes or tests. He reported that even in art, physical education, and vocational education, "Far too much of the performance observed was teacher rather than student determined" (p. 238). Yet, choice within educational activities offers students ownership and control of their learning and may serve to enhance relevance and achievement.

Enrichment clusters facilitate choices by both teachers and students as students and teachers choose their cluster. Students choose their role in the cluster and direct their own interest-based learning by selecting persons with whom they work, as well as their role in product or service development.

Enjoyment

Enjoyment is also instrumental in the learning process (Csikszentmihalyi, 1990; Dewey, 1916; Renzulli, 1994; Schiefele, 1991). Elements of enjoyment can exist when challenge, meaningfulness, choice, and interest are created in our schools. Providing a learning situation that is both enjoyable and engaging for the student is essential for student involvement, and involvement is central to learning. Unlike the classrooms observed by Goodlad (1984), which had flat tones with neutral emotion, ambiance, and a paucity of praise and guidance, Phenix (1964) emphasized the importance of appeal to the imagination. Renzulli (1988) suggested the need for artistic modification by teachers to make learning more enjoyable for students and teachers in his Multiple Menu Model for curriculum development. In *Schools for Talent Development* (1994), Renzulli proposed that learning is most effective when children enjoy what they are doing, and that creative productive individuals perform at optimal levels when they do what they enjoy. Creative productive adults often select areas of specialty in which they have interest, talents, and in which they find enjoyment and satisfaction. Schiefele, in his review of interest, learning, and motivation, reported that feelings of enjoyment and involvement are typical when one is interested in the matter at hand; within interest there is an element of enjoyment. Csikszentmihalyi found that topical interest was significantly correlated with involvement, enjoyment, concentration, and activation. It would seem, from this review of research, that if students enjoy their educational experiences, they may be interested and involved; therefore, they may learn more than if they do not enjoy their educational experiences.

Historically, the use of interests, strengths, personal meaning, and challenge have been advocated in designing alternative activities and learning experiences for gifted students. Lepper and Chabay (1985) proposed that promoting students' sense of control (choice), providing challenging activities, provoking curiosity (interest), and highlighting the functionality of an activity or topic (meaning) are ways to increase motivation in the classroom. In *Strategies for Educational Change*, Marks (1981) suggested the use of student interests as a basis for talent development, and said that student choice and involvement in educational activities should be based on their self-selected interest areas. It seems that if students are engaged through choice, challenge, interest, and meaning, learning will be enjoyable. Enrichment clusters take these ideas into account and add a final ingredient of productivity whereby students involved in the clusters are focused toward the production of an authentic product or service for a real audience.

Authentic Products or Services

The development of authentic, real world products or services is grounded in gifted education (Baum et al., 1994; Feldhusen & Kolloff, 1986; Renzulli, 1977, 1982, 1994; Renzulli & Reis, 1985; Shore et al., 1991) and is increasingly suggested in general education (DuCharme, 1993; Gatto, 1992; Good & Brophy, 1987; Levin, 1988; Pasch et al., 1995; Slavin, 1984). However, what is often used by general educators tends to be more project focused with less authenticity than the products or services recommended in gifted programs. Components such as student selection of topic and real world audience are commonly missing. Too often, projects are teacher-directed and assigned. Products or services recommended in gifted education involve student selection, use of authentic methodologies, and have as an outcome an impact on a real world audience.

Several studies have reported that students who complete meaningful products have increased self-esteem, motivation, and academic self-efficacy as a result (Baum, Emerick, Herman, & Dixon, 1989; Emerick, 1992; Whitmore 1980). Davis and Rimm (1985) advocate the use of student directed products based on student interests, and also indicate the importance of an audience for those products. The pedagogy which drives product development includes helping students find and focus problems (Renzulli, 1994), helping students learn and apply authentic methodologies (George, 1993; Phenix, 1964; Renzulli, 1988, 1994; Treffinger, 1986), and helping students discover and determine authentic audiences and outlets for the products and services which they have developed (Davis & Rimm, 1985; Renzulli, 1994). From the instructional strategies presented in the Multiple Menu Model for curriculum development, Renzulli (1988) recommends guided and unguided independent study, investigative reports or projects, internships, and apprenticeships as possible strategies for facilitating the development of authentic products. Bloom's (1985) work indicated the importance of an authentic audience. A recurring theme found in the talented young people he studied was the expectation that they would participate in many public events such as recitals, contests, or showings. Such events demanded commitment, preparation, and quality which involved the assistance of teachers and parents.

The product/service approach requires a change in the role of the teacher—from teacher to guide and facilitator (Phenix, 1964; Renzulli, 1983). Shore et al. (1991) recommended employing professional end-products as standards and emphasized the need for teacher training to assure success with "real products." Renzulli (1983, 1994) discussed the transformed role of the teacher as assistant, facilitator, and guide to help the student develop the product or service and find an appropriate audience or outlet for the students' work.

Because products and services involve the use of authentic methods and resources, the opportunity exists to involve the community with education. Reis and Burns (1987) discussed the value of involving community resources in education as good for the students, the community members, and the school. Blanchard (1981) advocated the use of community and parents in defining school programs and curriculum planning. Durden and Tangherlini (1993) explained that "one way of breaking down the separation between community and school will be to create as many opportunities as possible for adults to participate . . . in day to day activities . . . (of schools)" (p. 296).

Products have long been used in gifted programs, but their use with students of all achievement levels is undocumented. Reis and Renzulli (1982) added support for a broadened conception of giftedness when they found that there was no difference among the quality of student products from student in the top 5% of achievement or those from the next 15% in achievement. Baum et al. (1994) provided evidence for using products to help gifted underachievers succeed when they looked at the effect of student directed products on the self-efficacy and productivity of such students. Shore et al. (1991) called for research to assess whether the use of products in education can be adapted beyond gifted education to a wide range of abilities at different grade levels.

A need exists to focus on evolving academic and personal talents and interests of students. Sinclair and Ghory (1981) recognized that "the real gift is not in the person, but in the quality of the interaction between the educational environment and the learner" (p. 157). Products and services offer the opportunity for integrating student interests, challenge, choices, and meaning in an enjoyable learning environment among peers of like interest. Grouping on the basis of common interest and across ages is often recommended (Begle, 1975; Gamoran, 1990; George, 1993; Good & Brophy, 1987; Keating 1976; Kulik & Kulik, 1991; Parke, 1989; Rogers, 1991; Shore et al., 1991; Slavin, 1984), yet seldom done. Einstein (1934) recognized that young people, in particular, need opportunities to interact with individuals "of like mind." In his autobiography he stated: "Without the sense of fellowship with men of like mind, of preoccupation with the objective, the eternally unattainable in the field of art and scientific research, life would have seemed to me empty" (p. 238). Enrichment clusters provide the opportunity for students, teachers, and community members "of like mind" to interact, and focus toward the development of authentic products or services which are driven by student interests and choices.

Background of Enrichment Clusters

The enrichment clusters (Renzulli, 1994) are non-graded groups of students that share common interests, and that come together during specially designed time blocks to pursue these interests. Like extracurricular activities and programs such as 4–H and Junior Achievement, the main rationale for participation in one or more clusters is that *students and teachers want to be there.* All teachers (including music, art, physical education, etc.) are involved in organizing the clusters, and their involvement in any particular cluster should be based on the same type of interest assessment that is used for students in selecting clusters of choice.

The model for learning used with enrichment clusters is based on an inductive approach entitled enrichment learning and teaching, purposefully designed to create a learning environment that places a premium on the development of higher order thinking skills and the authentic application of these skills in creative and productive situations. The theory underlying this approach (Renzulli, 1994) is based on the work of constructivists such as Piaget (1975), Bruner (1960, 1966), and Dewey (1913, 1916), and the applications of constructivist theory to classroom practice. Enrichment clusters are excellent vehicles for promoting cooperativeness within the context of real world problem solving, and they also provide superlative opportunities for promoting self concept. A major assumption underlying the use of enrichment clusters is that *every child is special if conditions are created in which that child can be a specialist within a specialty group* (Renzulli, 1994, p. 70).

CHAPTER 3: Methodology, Results, and Discussion

In this chapter the research methodology, which was a combination of quantitative and qualitative methods, is described, including the procedures for selecting schools, the instrumentation, data collection, data analysis, and results. First, the sample is described, followed by details of the treatment and comparison groups. Then, instrumentation is discussed, followed by a general description of the data analysis procedures and results. The procedures and methods used for each research question are addressed, and the results are presented and discussed.

Both quantitative and qualitative methodologies were used for this study. Quantitative methods included descriptive and inferential statistical procedures such as frequency, factor analysis, and multivariate analysis of variance and covariance with repeated measures. These analyses were performed using the SPSS-X software package. In the original proposal, comparison group data were included for pre and post control group design, however, comparison group data were not used for each question due to low return rates on some of the instruments. Also, one comparison school had a recent administrative change, and faculty and staff were expected to change a number of teaching practices and programs. A great deal of resistance was offered by faculty in the light of these expectations, and one way the resistance manifested itself was in their refusal to complete paperwork assigned by the principal. For this reason, this school was eliminated from the analysis, leaving one comparison school which was used for both treatment schools across the districts. Accordingly, the procedures for our data analyses are explained as each research question is addressed.

Research questions four and five were addressed using qualitative procedures. Questionnaires, observations, and interviews gathered through the use of participant observation (Spradley, 1980) were analyzed. Field notes, transcriptions of the interviews, document review, and all other collected data were coded and analyzed for patterns and themes. The coding process used combined techniques described by Spradley (1979, 1980) and by Strauss and Corbin (1990).

Sampling Procedures

The process of selecting schools was dictated by the urban districts which had agreed to participate in the study. These districts had proximity to the University of Connecticut and had agreed to participate in the research when contacted by the principal investigator. First, a meeting was arranged with the assistant superintendents of each district to determine if the districts would be interested in participating. Once interest was established, a follow-up meeting was held with building principals to determine if faculty and staff would be receptive to working on the research project. After two principals expressed interest in the project, presentations to the faculty and staff of each building were made. The faculty of each school then decided to participate in the project. Presentations were made to the Boards of Education in each district detailing the scope and purpose of the study, as well as the benefits to the schools that would participate. Board of Education approval was given in both districts and implementation began in the experimental sites. Comparison schools were selected by consulting with the Superintendents and Assistant Superintendents in each district. In the first district, there were several schools from which to choose, and the school selected matched the treatment school on factors of size, location, and minority population. In the second district, only one other elementary school was appropriate for comparison purposes because the other elementary schools in the districts were involved in other innovations. The district demographics of both school districts involved in this study are displayed in Table 1.

The first district is located just outside of a major urban area in the Northeast which has the second highest child poverty rate in the country. In this district an overflow of students from this urban area has been experienced, and during the past three years this district had a 20% increase in minority students, which has been accompanied by an influx of students living below the poverty level. The minority population in this district was 42.9% during the year of the study.

The second district is located in a small urban area in the Northeast and has a student minority population of over 35% which consists primarily of Hispanic students and is the third largest Hispanic population in the state. Approximately 17% of this district's students are limited English proficient. Additionally, this area ranks 164th out of 169 cities its size with respect to median household income, with the sixth highest poverty ranking in the state.

Two elementary schools were designated as treatment schools for the clusters from two districts in the Northeast. Both were considered urban and culturally diverse with a high concentration of economically disadvantaged students. One elementary school in each district implemented the enrichment cluster intervention while a third elementary school was assigned to serve as a comparison site. Both quantitative and qualitative methodologies were used to examine and describe the impact of the interventions on classroom teachers, students, and parents.

Table 1

District Demographic Information

Variable	District #1	District #2
K-12 student population	6441	3370
Percentage of minority students	42.9	35
Number of schools	14	6
Building configurations (with numbers of buildings in parentheses)	K-3 (1) K-6 (9) 7-8 (1) K-12 (1) 9-12 (2)	K-5 (4) 6-8 (1) 9-12 (1)

The treatment schools for this study were selected by the Assistant Superintendent or Superintendent of Schools for several reasons. First, the treatment schools were those in which administrators expressed an interest in taking part in the study. Additionally, there were internal political reasons in each district as to why the treatment schools were selected. In one district, the treatment school was located next to the science and technology magnet school. By placing the cluster program in the "non-magnet" school, it was hoped that positive public relations would result. In the second district, the desegregation and integration of a primarily upper-middle class school was perceived by the Superintendent as a rationale for the selection of the school as the site. Placing the enrichment clusters program in that school was regarded as a way to provide a positive tone and offer students a talent development program that other schools in the district did not yet have.

Comparison schools were assigned by the Superintendent or Assistant Superintendent in both districts that best matched the treatment schools on demographic variables as shown in Tables 2 and 3. In the comparison school from district two, a recent change of administration had occurred and there were several union and contractual issues occurring that were unrelated to the study. There was resentment among the staff regarding their school's selection as the comparison site. As a result of these issues, return rates for student, teacher, and parent surveys and instruments were very low (less than 30% in most cases, and less than 15% in others). Consequently, due to the low return rate and probable bias in those instruments that were returned, this comparison school was eliminated from all data analyses. The comparison school from district one was used throughout the study as a comparison in both treatment schools. Covariance procedures were used accordingly to equate the groups on initial differences. As shown in Table 2, this comparison school was a K-6 building with 17.5 classrooms and a minority population of 31.5%. It was located less than two miles from treatment school one, and 20.9% of its students received free or reduced lunches.

The remaining comparison site was most helpful with the instrumentation (many surveys approached 100% response rate), with the exception of the *Parental Attitudes About Enrichment Opportunities* questionnaire and the *Classroom Practices–Teacher Survey*. When the parent survey was completed by parents, many parents indicated that little enrichment had taken place for their children. These negative comments were regarded as criticism by the principal, so as a public relations measure, the administrator chose to inform parents in the PTO of what he believed to be the large number of enrichment activities that were occurring with regard to enrichment in this school, thereby affecting the post-survey data. The post *Classroom Practices–Teacher Survey* was not completed by two-thirds of the teaching staff at the comparison site, creating a small number of surveys to be used for comparison purposes. These issues, combined with a low return rate from this school, were reasons that we decided to eliminate the comparison school from our data analysis regarding questions pertaining to parent attitudes and teaching practices. Instead, we focused on the pre to post responses of the treatment schools and on comparisons with national samples as described later.

The first treatment school consisted of a K-6 building with a total population of 445 students. Of these students, all were involved in the enrichment clusters with the exception of the morning kindergarten students, who had the option of returning to school to attend the clusters. Because transportation was an issue, only eight students returned to participate in the enrichment clusters. This school is a long sprawling school with three wings: one wing houses 1st-3rd grades; another wing contains kindergarten and 4th-6th grade; and the third wing has art, music, physical education, and speech. At the heart of the school are the office and cafeteria/all-purpose room. As this was an urban area having financial problems, resources and equipment were limited, with no computer lab and limited audio-visual equipment.

The second treatment school was a K-5 building with a student population of 350 students, all of whom were involved in the enrichment cluster program. The same situation with the morning kindergarten classes existed as with the first treatment school, with only 10 students electing to return for the clusters. This school building has 17 regular classrooms, including two portable classrooms located behind the main building. Additional rooms include a library, a gymnasium, cafeteria, and a health room. One additional classroom is divided between remedial reading and special education. Because of the poverty in this city, the education budget is limited and precarious, and the school's resources, equipment, and materials are restricted. Space is also limited; for example, a locker room and shower are converted to a small enrichment room/math room, several specialists either don't have a desk or share a desk, and groups of students often work on the floor in the halls.

The comparison school had a student population of 455 in kindergarten through sixth grades. In Tables 2 and 3, demographic information is provided from the two treatment and the comparison school in the study. For all schools in the study, due to the nature of the instrumentation, data collection was primarily limited to students in grades 2 through 5 or 6. However, data were collected from all teachers.

Demographic data were obtained on the *Classroom Practices–Teacher Survey* which described the teachers in the treatment schools. Descriptive statistics follow for the teachers in each of the experimental sites (see Tables 4 and 5).

Instrumentation

Parental Attitudes About Enrichment Opportunities

To address research question number two, the *Parental Attitudes About Enrichment Opportunities Questionnaire* was developed because appropriate instrumentation did not exist. A complete discussion of validity and reliability evidence of this new instrument follows.

Content Validity

Following a review of the literature described earlier, items were written and their content validity was assessed by a panel of 12 experts from the field of gifted education, including teachers, program coordinators, university professors, and doctoral students. Experts were asked to select the category in which they thought each item belonged and indicate how confident they were about this selection. Based upon expert feedback, 10 items were selected for inclusion in the survey instrument. Selection criteria included percentage agreement of 80% or greater and a confidence mean above 2.3 out of a possible 3.0. Several items that had acceptable agreement and confidence means were eliminated due to repetition of content and a desire to limit the instrument to a number of items to which parents might take the time to respond.

Table 2

Demographic Information About Students in Treatment and Comparison Schools

Variable	Treatment School A District 1	Treatment School B District 2	Comparison School District 1
Student population	445	350	455
Grade range	K-6	K-5	K-6
#Kindergartens	1.5	2	2.5
#First grades	2	4	2
#Second grades	2	3	3
#Third grades	3	2	3
#Fourth grades	3	2	2
#Fifth grades	2	2	2
#Sixth grades	2	0	2
Average class size	22	18	22
Free/reduced lunch	16.4%	39.0%	20.9%
Non English in home	8.8%	21.0%	7.9%
Preschool, Headstart, Nursery school	82.5%	50.0%	66.2%
Special education students	23.3%	7.4%	16.8%
Race/Ethnicity			
Asian American	2.5%	.3%	3.1%
African American	7.9%	3.3%	16.4%
Hispanic American	7.4%	28.3%	11.9%
Native American	.3%	0.0%	0.0%
Caucasian American	82.2%	67.9%	68.5%

Note. Source Connecticut State Department of Education, *Strategic School Profiles 1993-1994*

Table 3

Demographic Information About Teachers in Treatment and Comparison Schools

Variable	Treatment School A	Treatment School B	Comparison School
Numbers of Staff			
Regular Classroom	15.0	16.0	16.5
Art/Music/PE	3.5	2.4	3.8
Special Program	5.0	4.5	2.8
Other	1.0	2.0	1.0
Pupil Personnel	2.0	2.1	1.5
Total Certified	**27.5**	**28.0**	**26.6**
Administrators	1.0	1.0	1.0
Non-certified (Instructional)	14.0	10.0	12.0
Non-certified (non-instructional)	5.0	7.0	6.0
Demographics			
Master's Degree	77.4%	88.2%	75.9%
Trained as Mentor	29.0%	32.4%	24.1%
Minority staff	3.2%	2.9%	6.9%
Avg. years experience	17.7	11.6	20.3

Note. Source Connecticut State Department of Education, *Strategic School Profiles 1993-1994*

Table 4

Frequency and Percentage of Years Teaching Experience by Treatment School (*n* = 32)

Years teaching	Treatment School A	Treatment School B
1-5 year	4 (26.7)	4 (23.6)
6-10 years	0 (0.0)	4 (23.6)
11-15 years	2 (13.3)	4 (23.6)
16-20 years	2 (13.3)	2 (11.8)
21 -more	7 (46.8)	3 (17.7)
Total	15 (100.1)	17 (100.3)

Note. Numbers in parentheses are percentages.

Table 5

Frequency and Percentage of Training in Teaching G/T by School

Training	Treatment School A	Treatment School B
None	9 (60.0)	8 (47.1)
District inservice	1 (6.7)	3 (17.6)
Workshop	0 (0.0)	1 (5.9)
Coursework	5 (33.3)	5 (29.4)
Total	15 (100.0)	17 (100.0)

Note. Numbers in parentheses are percentages.

The instrument was revised based on the experts' ratings. The final instrument (see Appendix B) included an operational definition of enrichment and demographic items including name, relationship to the child, and child's grade. This section was followed by 10 statements with a 5-point Likert scale response format. It also included three open ended questions.

Sample

The instrument was sent home with all students in both treatment and comparison schools. Pre to post responses were above 50% for both treatment schools due to the second requests sent by the researchers and below 10% for the comparison school. This low response rate was due to the fact that researchers were not able personally to contact parents in the comparison school and because, unlike the treatment school, there was only one request for the questionnaire. Due to this low response rate, and the bias discussed earlier, data from the comparison school on this instrument were eliminated. Therefore, data analysis focused on treatment school parents' pre and post responses. Responses on the pretest of the parents from the treatment and comparison schools were used to assess the construct validity support for the instrument.

Construct Validity

Factor analysis was used to examine the dimensionality of the item set. An exploratory principal factor analysis with varimax and oblique rotation was performed to examine construct validity on the ten *Parental Attitudes About Enrichment Opportunities* questionnaire items using SPSS-X. After preliminary analyses, five surveys were deleted due to missing data. The remaining 291 surveys were used in the data analysis. The ratio of cases to variables was 29:1, a sufficient *N:p* ratio for factor analysis (Gable & Wolf, 1993).

The results of the factor analysis indicated that two factors existed for the questionnaire using both varimax and oblique rotations. Using the Kaiser-Harris criterion (minimum eigenvalue = 1), factors with eigenvalue less than 1.00 were not retained. The results of the factor analysis with varimax and oblique rotation loading are included in Tables 6 and 7. Loadings under .40 (16% of variance overlap) were omitted. Table 8 displays final communality, eigenvalue, and percentage of variance. The intercorrelation between factor 1 and factor 2 was .40 (see Table 9). A two factor solution accounted for

62.5% of the total variance. The eigenvalue values of factor 1 and factor 2 were 5.22 and 1.03. Although item 5 revealed a slightly different pattern in the varimax and oblique rotations, item 5 was included in factor 1 based on conceptual meaning. After examining the correspondence between judgmental categories and derived factors, factor 1 was named *Perception of Enrichment* since items defining this factor describe what perceptions a parent has about enrichment opportunities in school. A high score would indicate that a parent believes that his/her child is offered many opportunities for enrichment and talent development, which has an impact on how much the child enjoys school. Factor 2 was named *Satisfaction with Enrichment* because items defining this factor describe whether a parent is satisfied with the enrichment opportunities in the school and whether he/she is informed about what is happening with respect to enrichment. A high score indicates the parent believes he/she would be informed about and pleased with the school's enrichment opportunities.

Reliability

Alpha reliability estimates for the previously described factors from the parent questionnaire were run using SPSS-X for Macintosh and mean substitution procedure was used to estimate the responses of 5 surveys with missing values. A total of 296 surveys provided data for the reliability analyses.

Reliabilities for the two factors from the parental attitudes survey exceeded an acceptable level of reliability of .70 for an affective measure (Gable & Wolf, 1993), which indicated that the items within these factors have high internal consistency. The alpha reliabilities for both factor 1 (.87) and factor 2 (.77) are provided in Table 10.

Table 6

Principal Component Analysis With Varimax Rotation: *Parental Attitudes About Enrichment Opportunities* (*n* = 291)

Item Number	Stem	Loading	
		Factor 1	Factor 2
1.	My child has opportunities for enrichment experience in school	.57	.52
2.	During school my child is encouraged to develop and pursue her/his talents	.62	.49
3.	My child develops projects in the classroom that reflect her/his talent	.67	.42
4.	My child has opportunities to work with other students in his/her classroom who share common interests	.67	.35
5.	My child's school offers enrichment opportunities for all students	.53	.58
6.	My child enjoys the enrichment opportunities in his/her school or classroom	.78	
7.	My child is happy about attending school	.71	
8.	I am informed about the educational enrichment activities for my child at school		.76
9.	I have the opportunities to become involved with enrichment opportunities in school		.83
10.	I am satisfied with enrichment opportunities/experiences my child received at school	.49	.69

Table 7

Principal Component Analysis With Oblique Rotation: *Parental Attitudes About Enrichment Opportunities* (*n* = 291)

Item Number	Stem	Loading Factor 1	Factor 2
1.	My child has opportunities for enrichment experience in school	.57	
2.	During school my child is encouraged to develop and pursue her/his talents	.63	
3.	My child develops projects in the classroom that reflect her/his talent	.70	
4.	My child has opportunities to work with other students in his/her classroom who share common interests	.70	
5.	My child's school offers enrichment opportunities for all students	.53	.40
6.	My child enjoys the enrichment opportunities in his/her school or classroom	.84	
7.	My child is happy about attending school	.77	
8.	I am informed about the educational enrichment activities for my child at school		.67
9.	I have the opportunities to become involved with enrichment opportunities in school		.87
10.	I am satisfied with enrichment opportunities/experiences my child received at school	.48	.53

Table 8

Results of Principal Component Analysis: Communality, Eigenvalue, and Accounted Variance

Factor	Item Number	Communality	Eigenvalue	Accounted Variance
Factor 1	1	.59	5.22	52.2%
	2	.62		
	3	.63		
	4	.57		
	5	.61		
	6	.63		
	7	.51		
Factor 2	8	.67	1.03	10.3%
	9	.69		
	10	.72		

Table 9

Parental Attitudes About Enrichment Opportunities Factor Intercorrelation ($n = 291$)

	Factor 1	Factor 2
Factor 1	1.00	
Factor 2	.40	1.00

Table 10

Parental Attitudes About Enrichment Opportunities Alpha Reliability ($n = 296$)

Factor	Item Number	Mean	Standard Deviation	Corrected r With Category	Category Alpha Reliability if Item Deleted	Category Alpha Reliability
1	1	3.74	.84	.67	.84	
	2	3.77	.93	.70	.84	
	3	3.69	.90	.72	.84	
	4	3.69	.85	.66	.85	
	5	3.74	.95	.65	.85	
	6	4.12	.91	.63	.85	
	7	4.32	.90	.46	.87	.87
2	8	3.80	1.08	.65	.63	
	9	3.49	1.20	.56	.75	
	10	3.80	.95	.61	.69	.77

Arlin-Hills Attitude Survey Toward School Learning Processes

Pre and post student attitudes toward learning were measured with the *Arlin-Hills Attitude Survey Toward School Learning Processes*. Two forms of this survey were used in this study, one for primary level students (grades K-3) and one for elementary level students (grades 4-6). These two 15-item surveys assess a number of factors about school climate that may have an impact on the implementation of enrichment clusters. For example, factor analytic validity studies of the *Arlin-Hills Attitude Survey* based on a sample of 13,806 students, revealed that constraints related to learning choices (e.g., students work in small groups, students study with friends) and teacher dominance (e.g., teacher talk, students need permission) are represented by scores (*Manual for Arlin-Hills Attitude Survey*, 1976, p. 7). The internal consistency coefficient for the instrument, as determined by a split-half procedure with a Spearman-Brown adjustment ($n = 6{,}000$), was

0.90. As the instrument is copyrighted, three sample items are included in Appendix C to provide readers with additional information about the instrument.

Content Area Preference Scale

The *Content Area Preference Scale (CAPS)* was developed to measure student preference toward school subjects (i.e., reading, mathematics, science, and social studies) before and after an intervention of curriculum compacting. The *CAPS* consists of twenty 3-point Likert items where students circle either a happy face (I agree with statement), an uncertain face (I neither agree nor disagree with statement), or a sad face (I disagree with the statement). A copy of the instrument is included in Appendix D. An initial pool of 40 items was developed for the scale. All items were inspected for the suitability of vocabulary for these academic levels through two basic means. First, textbooks at the elementary school level were inspected for commonly used words and phrases. Second, teachers who had experience working with elementary school children (grades 2-6) were asked to inspect the items and suggest changes as they saw necessary. Two pilot studies were performed to eliminate poor items and to reduce the item pool from 40 to 20. The 20 items were then examined for reliability and validity using an extensive set of procedures (Kulikowich, Reis, Owen, & Smist, 1992). The reliability coefficients for the reading, mathematics, science, and social studies subscales, as determined by Cronbach's Alpha, were greater than .80.

Student Product Assessment Form

The *Student Product Assessment Form (SPAF)* (Renzulli & Reis, 1985) was selected as an instrument because it provides a valid and reliable basis for assessing product quality as a measure of achievement and is included in Appendix E. The *SPAF* includes two components. The first is related to the process of product development and includes eight items which have a 1-5 Likert-type response scale. Also included for these items is a "Not Applicable" category. Each of these items is comprised of three parts: the key concept, a description of that item, and examples to help provide clarity. The second component is related to the overall quality of the products. It includes seven items responded to on a 1-4 Likert-type scale. This instrument has a high interrater reliability of .961 for the total of all its items, if more than one rater is evaluating the product. Content validity was insured through the contributions and critical evaluations of experts in the field of gifted education and that of educational research (Reis, 1981).

Classroom Practices–Teacher Survey

An adaptation of the *Classroom Practices–Teacher Survey (CPS)* was used to assess teachers' classroom practices before and after the enrichment cluster intervention. Teachers in both treatment schools and the comparison school completed the *CPS*. The *CPS* consists of 39 items to which teachers respond on a 6-point Likert scale ranging from "never" to "more than once a day." Originally developed for a national study which assessed classroom practices of teachers with regard to gifted and average students (Archambault et al., 1993), this survey was adapted for this study by omitting the column that asked teachers to rate the frequency with which they used various teaching strategies with gifted students, leaving only the column that asked the frequency with which the same strategies were used with average students. The *CPS* was further adapted by the elimination of many of the preliminary demographic items that were not needed for this study. Originally there were three full pages of demographic questions. These were reduced to one-half page of information pertinent to the enrichment cluster study, resulting in a survey that was easier for teachers to complete. The original 39 items that required a Likert-frequency response were unchanged. The adapted instrument is in Appendix F.

To develop this instrument, a team of educators of gifted students and psychometricians reviewed the literature on the methods with which classroom teachers could differentiate instruction for gifted students. They determined that this could be done by: (1) alternative arrangements for grouping students for instruction; (2) providing advanced or accelerated work; (3) offering instruction in higher level thinking skills; (4) providing within class enrichment activities; (5) modifying the regular curriculum by using compacting, or by providing alternative instructional formats; and (6) providing more challenges and choices in the curriculum. Using these areas as a basis, items for the survey were generated and a pilot study conducted, after which revisions were made and a field test ($n = 400$) completed. In the field test, two versions of the instrument were administered. The first asked teachers to rate their practices with regard to average students, and the second asked teachers to rate their practices with regard to average *and* gifted students. There were no significant differences found between the version that asked teachers about their practices with average students and the survey which asked teachers about their practices with both average and gifted students. The enrichment cluster study used an instrument similar to the first version in this field test.

The final questionnaire was completed by a national sample of 3,880 teachers. Responses to the 39 items were factor analyzed yielding a theoretically and statistically defensible set of subscales. Principal axis factoring with a varimax rotation was used with eigenvalues greater than 1.0 and scree plots to determine the number of factors. Most items had loadings greater than .35. Because a 6 factor solution was expected on theoretical grounds, a 6 factor solution was forced. Based on clustering of items, factors were named as follows: (1) Questioning and Thinking; (2) Providing Challenges and Choices; (3) Reading and Written Assignments; (4) Curriculum Modifications; (5) Enrichment Centers; and (6) Seatwork. Alpha reliabilities for the factors were .83, .79, .77, .72, .72, and .53, respectively. Subsequent analysis provided an identical six factor solution for "average" student ratings with alpha reliabilities of: .82, .78, .77, .67, .71, and .50, respectively.

Student Roster

The student roster was developed for use in the classroom observation study (Westberg et al., 1993) to identify students performing at various levels, as well as to collect demographic information about students in teachers' classrooms. The version used in this study was completed by the classroom teachers in November, 1994, prior to the implementation of the enrichment cluster program. Teachers completed columns of information which asked for the students' name, gender, ethnicity, special program placement (if any), and for a rating in both mathematics and reading performance. In rating students' performances, teachers were asked to record their first reactions to students' performances in math and reading using a Likert scale as follows: 1 = low, 2 = below average, 3 = average, 4 = above average, 5 = superior. (See Appendix G for a copy of this roster.)

Student Evaluation Forms

Two evaluation forms were developed to gather feedback from students who were involved in the cluster. One form was designed for students in grades K-2 and the other for students in grades 3-6. Each contained four questions to which students responded on a 3-point Likert scale, followed by four open-ended questions. Copies of these instruments are included in Appendix H.

Facilitator Evaluation Form

This evaluation form was developed to provide a forum to gather comments from enrichment cluster facilitators. All of the items were open ended and addressed issues such as: *What did you enjoy most about facilitating your cluster? What types of advanced content did you present in your cluster? What products were produced by students in your cluster?* This instrument is included in Appendix I. It was used in a formative evaluation process and provided information which was used to make adjustments to the clusters between sessions.

Treatment and Procedures

A part time (2 days/week) enrichment cluster coordinator was assigned to each treatment school. These persons were familiar with the goals, philosophy, and implementation of enrichment clusters; their primary responsibilities were to implement both a pilot and longer sessions of enrichment clusters within the treatment schools. The tasks involved working with teachers, facilitators, parents, and administration to determine student and staff interests, develop and schedule clusters, register students, and oversee the enrichment cluster program after it began. The secondary responsibility of the coordinators was to work with the research team in the collection of data from these schools. Each coordinator and the research team from the University of Connecticut kept a log of pertinent events related to the implementation of the enrichment cluster programs.

Each treatment school faculty and staff received an hour and a half inservice regarding enrichment clusters prior to the program's beginning, and continuing support and contact from the coordinators and research assistant throughout the duration of the program. After a three week pilot in the late fall, each coordinator and the research assistant met with staff to make appropriate adjustments to the program before beginning a longer session during the winter. At these meetings, adjustments were made in length of sessions, days of the week, and to schedule around classes taught by specialists such as music, art, and physical education. Faculty and staff at Treatment School A decided upon two six-week series of clusters to be held weekly on Friday afternoons from 1:30 p.m. to 2:30 p.m. Further, they determined that those clusters which wanted to continue after six weeks could meet for all twelve sessions. Faculty and staff at Treatment School B elected to run two five-week sessions meeting from 1:15 p.m. to 2:30 p.m. weekly on Tuesday afternoons. Like Treatment School A, clusters had the option of continuing after the first five weeks for ten weeks straight. Clusters began after the December break and ended in May. Figure 1 contains a timeline of the implementation of all of the cluster series in both treatment schools, and Tables 11 and 12 include a sample of the clusters which were offered during the pilot and treatment series for each school. See Appendix J for a sample listing of the enrichment clusters offered in each school.

During the second and third series of clusters, the facilitators were interviewed using a protocol included in Appendix K. These interviews were both audio and videotaped and transcribed. Each of the treatment schools served as visitation sites for other schools that were considering implementing similar programs. At the conclusion of the clusters, both students and facilitators completed evaluation forms which are included in Appendices H and I. Together with observations by the coordinators and the research assistant, these data were used to investigate teachers' perceptions of enrichment, whether teachers used enrichment cluster teaching strategies within their own classrooms, and how advanced content was used within the enrichment clusters.

Instrumentation administered on a pre and post basis at the treatment and comparison schools included: *Attitude Survey Toward School Learning Processes*, the *Content Area Preference Scale* for students, the *Parental Attitudes About Enrichment Opportunities* survey for parents, and the *Classroom Practices–Teacher Survey* for teachers. The student roster was used only in treatment schools and the *Student Product Assessment Form* was used to assess products within the treatment schools. The parent surveys from the treatment schools were followed with a second request by the coordinator to assure adequate return rates. For the bilingual populations, surveys and questionnaires were translated into Spanish. Student and teacher instruments were collected and coded by the research assistant and coordinators to ensure high response rates (100% in treatment schools). However, access to the comparison school was more limited, and return rates were lower than desired.

Timeline of Cluster Implementation Activities

September:	Contacted the School Districts Regarding the Study
October:	Met with central office and building administration
October:	Met with faculty and staff of interested schools and gave overview of the enrichment cluster program and study
October:	Presented study to Boards of Education for approval
November:	Gathered pre data from both treatment and comparison schools
November:	Ran Facilitator Orientation Training Sessions
November:	Began three-week pilot series
December:	Debriefed the pilot series and adjusted planning for the treatment series according to teacher input
January – May:	Implemented 10 and 12 week series of clusters in treatment schools
April:	Gathered post data from treatment and comparison schools

Figure 1. Cluster implementation timeline.

Table 11

Cluster Titles by Session and Dates School A

Pilot Session Clusters: Nov. 18, 1994; Dec. 2, 9, 1994

Pilots Inc.
Creative Dance Troupe
Dioramas
Mr. Frank's School Improvement
Fanciful Puppetry
Nutrition: Your Body and You
Sign Language
Illusions of Science
Oldies But Goodies
Young Reporters' Club
Games People Play
Young Entrepreneurs
Young Voices Ensemble
Kitchen Science
Bravo Children's Theater
How Do I Work?
Builders, Inc.
Capture the Spirit
Young Authors
Creative Design
History of the Motion Picture

Treatment Session I Clusters:
Jan. 27, 1995; Feb. 3, 10, 17, 1995; Mar. 3, 10, 1995

Creative Dance Troupe
Horticultural Society
Police Academy
Young Crafters Guild
Young Musicians Ensemble
Young Scientists
Future Office Management
Native American Study Group
Young Explorers
Talent Productions, Inc.
Latin Association

Treatment Session II Clusters:
Mar. 31, 1995; Apr. 7, 28, 1995; May 5, 12, 19, 1995

Sign Language
Martial Arts Team
The Drawing Guild
Young Interns
Engineering I
Experimental Games
Tap Dance Association

Treatment Session I & II Clusters:
Jan. 27, 1995; Feb. 3, 10, 17, 1995; Mar. 3, 10, 1995
Mar. 31, 1995; Apr. 7, 28, 1995; May 5, 12, 19, 1995

Paleontologist Society
Spanish Group Ltd.
Young Voices Ensemble
History of the Motion Picture
Spring Training
Video Production Co.
Builders, Inc.
SOS Project Recycle
The French League
Young Authors
Creative Design
Young Artists' Guild
Dioramas

Table 12

Cluster Titles by Session and Dates School B

Pilot Session Clusters: Nov. 18, 1995; Dec. 2, 9, 1995

The Art of Quilting
Bikers Club
Birds of a Feather
Bravo! Children's Theater
Computer Drawing
Dairy Farming
Detective for a Day
Children and the Law
Origami Magic
Pop-up Cards
Sign Language
A Colonial Art: Stenciling
Storytelling Club
Animal Behavior
Bluebirds
The Art and Science of Calligraphy
Young Artists' Guild
Dance to the Music
King Tut: His Tomb and His Treasure
School Newspaper
Lights, Camera, Action
Create a Sculpture
Snakes in the Grass
You Are What You Eat

Treatment Session I Clusters
Feb. 7, 14, 28, 1995; Mar. 7, 14, 1995

Animal Trainers, Inc.
Bikers, Inc.
Colonial Artists' Workshop
Invention Convention
Science of Power
Paleontology Association
Chimers Handbell Choir
Decorative Artists Guild
Natural Resources Conservation Service

Treatment Session II Clusters
Mar. 21, 28, 1995; Apr. 4, 18, 25, 1995

Life Undersea
Police Academy
Young Musicians, Inc.
Poets' Society
Horticulture Alliance
Spring Trainers, Inc.
Improv, Etc.

Treatment Session I & II Clusters
Feb. 7, 14, 28, 1995; Mar. 7, 14, 1995
Mar. 21, 28, 1995; Apr. 4, 18, 25, 1995

Multicultural Society
Puppeteers Workshop
Young Artists' Guild
League of Engineers
Arts & Threads Guild
Bluebird Builders, Inc.
Creative Stitchers' Workshop
Young Firefighters Assoc.
Future Farmers
NASA Exploratory Group
Ukrainian Artists Guild
Young Scientists' League
Irish Society
Aviators/Flight School
Computer Connection
Culinary Institute
Forest and Wildlife Biologists Society
Gamers Institute

Data Analysis and Results

In both of the treatment schools and the comparison school, data collection and analysis were limited to students in grades 2 and higher because of the nature of the instruments and product development expectations. So, while all students were involved in the enrichment clusters and qualitative analysis focused on all grades, quantitative analysis of student data was limited to students in grades 2 through 6. It should be noted, however, that the quantitative analysis of teacher data involved teachers from all grade levels.

Qualitative analysis procedures included a coding process combining the techniques described by Spradley (1979; 1980) and by Strauss and Corbin (1990), and utilized observations, questionnaires, and interviews. Through the use of participant observation (Spradley, 1980), including field notes, transcriptions of the interviews, and document review, all data were coded and analyzed for patterns and themes.

The research questions that guided the implementation of enrichment clusters and the collection and analysis of data for the study were as follows:

1. What are the effects of the implementation of enrichment clusters on students'
    A. interests,
    B. attitudes about school, and
    C. product development?
2. What are the effects of the implementation of enrichment clusters on parental attitudes about school satisfaction?
3. How do teachers in the groups differ with respect to their attitudes about the use of enrichment activities for students?
4. Do teachers in the experimental sites use strategies learned in organizing enrichment clusters in their regular classroom teaching?
5. How is advanced content used in enrichment clusters?
6. How many students complete products in the enrichment clusters, and what is the achievement level of students completing products?
7. Does the quality of student products differ among students of various levels of achievement?

In the following sections the data analyses and results of these research questions are addressed with respect to the categories of student interests, student attitudes, student products, parental attitudes, and teacher practices.

Student Interests

Research Question #1A: What are the effects of the implementation of enrichment clusters on students' interests?

To address research question #1A, a multivariate analysis of covariance (MANCOVA) was performed on four subscales of the *Content Area Preference Survey (CAPS)*. The independent variables were group (experimental and comparison group) and sex. Dependent variables were *CAPS* posttest which included the following four subscales: language arts, science, social studies, and mathematics. The pretest on the four scales of the *CAPS* was used as the covariate.

SPSS-X frequency and MANOVA were used for evaluating the assumptions, with the number of surveys reduced from 708 to 676 due to missing data. Because all pretest and posttest subscale scores were severely negatively skewed, a logarithmic transformation was performed for all variables. There was no sign for multicollinearity and the assumption of homogeneity of variance-covariance matrix was satisfied.

Wilk's Lambda was used to evaluate the main effect and interaction effect. A significant difference was found in the interaction effect between group and sex on the four subscales of the *CAPS* survey after the initial differences were accounted for using the pretest (*F* [4,665] = 2.77, $p < .05$, *ES* = .02). However, there was no significant difference on both groups (*F* [4,665] = .62, $p = .65$) and gender (*F* [4,665] = 2.09, $p = .08$). Because only an interaction effect was found to be significantly different in the omnibus test, univariate *F*-tests on the interaction effect were done as a follow-up. These four univariate *F*-tests for interaction effect on the subscales of *CAPS* were not significant with a Bonferroni adjustment (see Table 13). This result indicates that a combined dependent variable maximized the interaction effect revealing group differences not shown in the univariate *F*-tests (Tabachnick & Fidell, 1989). For further information, the combined observed and adjusted mean scores are displayed in Table 14. The experimental group girls showed higher interest ($M = 1.34$) than comparison group girls ($M = 1.37$) on the Language Arts subscale, whereas the experimental group boys showed higher interest on the mathematics and science subscales than did the comparison group boys.

To further address research question #1A, student absences were recorded for days when enrichment clusters were scheduled and for days when enrichment clusters were not scheduled. Although chi-square analysis yielded no statistically significant differences in mean absences, in both treatment schools, fewer students were absent on enrichment cluster days than on the same days of the week when there were no enrichment clusters (see Table 15). This may indicate that students wanted to come to school more on enrichment cluster days, perhaps because of their interest in their clusters.

Student Attitudes

Research Question # 1B: What are the effects of the implementation of enrichment clusters on student's attitudes about school?

To address research question #1B, a *t*-test was performed to evaluate group differences on the *Arlin-Hills Attitude Survey Toward School Learning Processes.* In the original proposal, the pretest was to be used as a covariate, but pretest and posttest data could not be matched because many students did not write their names on the pretests. A space for names is not included on the instrument and although requested, many teachers at the comparison schools did not instruct the students to put their name on this instrument. Therefore, as a preliminary equivalency test, a *t*-test was performed on the pretest which indicated that the treatment and comparison schools in the study were not equivalent initially, therefore the posttest comparison could not be made.

Table 13

Results of Univariate *F*-Test for Four Factors of *CAPS* for Interaction Effect

Univariate *F*	*SS*	*Ms*	*F*	*p*
Language	.04	.04	3.47	.06
Mathematics	.02	.02	1.36	.25
Science	.02	.02	1.23	.27
Social studies	.01	.01	.58	.45

Table 14

Observed and Adjusted Means on the Subscales of *CAPS*

		Language Arts Obs (Adj)	Mathematics Obs (Adj)	Science Obs (Adj)	Social Studies Obs (Adj)
Experimental Group	Girl	1.31 (1.34)	1.63 (1.56)	1.46 (1.47)	1.68 (1.65)
	Boy	1.54 (1.49)	1.54 (1.57)	1.42 (1.44)	1.73 (1.75)
Comparison Group	Girl	1.38 (1.37)	1.49 (1.51)	1.46 (1.42)	1.61 (1.63)
	Boy	1.36 (1.39)	1.55 (1.58)	1.47 (1.47)	1.68 (1.67)

Note. A lower value indicates high interest.

Table 15

Mean of Number of Absences by School

	Treatment School A (*N* = 445)	Treatment School B (*N* = 350)
Enrichment day	26.36	15.60
Non enrichment day	30.19	17.04

Student Products

The analyses which follow in this section address three of the study's research questions about student products.

Research Question #1C: What are the effects of the implementation of enrichment clusters on students' product development?

Research Question #6: How many students complete products in the enrichment clusters and what is the achievement level of students completing products?

Research Question #7: Does the quality of student products differ among students of various levels of achievement?

One of the main goals of the enrichment clusters is for students to complete a product or provide a service. The students who participated in the enrichment clusters were expected to produce products either individually or as part of a group. Although many students completed products, the products should not be regarded as the type of product typically produced by gifted children in an enrichment program for several hours a week over the course of an academic year. Many of the products developed in the enrichment clusters were completed in three to six hours and were either group products produced by the whole class such as a volcano or a puppet, or individual products such as Native American beads or an illustrated book written by a student. Several major differences between the projects developed in the enrichment clusters and those produced in a gifted program were noted, including the depth of the student involvement, the resources used, and often the lack of an authentic audience. This is not to say that the products were not important. For a beginning program, in its first year, the number and overall quality of the products was very promising. In future years these products can be improved upon by allowing students more autonomy and diversity in choice as well as through the integration of authentic audiences and outlets for the student work as depicted in Table 16. Of the 482 students in grades 2-6 who participated in enrichment clusters in both schools, 430 students (89.2%) developed group or individual products in one of their clusters. The products of 40% of the student population ($n = 172$) were purposefully selected for evaluation due to their applicability for evaluation using the *Student Product Assessment Form* (SPAF) (Renzulli & Reis, 1985). This instrument, described earlier, was used to evaluate student products with regard to the process of product development and the overall quality of product. For each of the products selected, two raters completed *SPAF*s. Raters included the enrichment cluster coordinators and facilitators who worked with the students and who had received instruction regarding the use of the *SPAF*. Due to their association with students and the enrichment cluster program, ratings may have been different than if evaluations had been done by persons not affiliated with the program. The following tables present descriptive information about the production of products by students.

During the treatment, two series of clusters were implemented. In Table 17 the number of clusters offered during each series and the number of students who completed products are displayed.

The frequency of product development among various ethnic groups within the treatment schools was determined. To determine if differences existed among ethnic groups regarding the number of products produced, chi-square analysis was performed using ethnicity and the frequency of product development. Two missing cases were found. The results indicated that there were no significant differences among ethnic groups with respect to the number of products completed (X^2 [4, $N = 471$] = 8.68).

Table 16

Frequency and Percentage of Student Product Development by School

Product	Treatment School A	Treatment School B
Yes	235 (86.1)	195 (98.5)
No	38 (13.9)	3 (1.5)
Total	273 (100.0)	198 (100.0)

Number of missing observations = 11
Note. Number in parentheses indicates percentage of students.

Table 17

Number of Clusters and Products

	Treatment School A		Treatment School B	
	Session 1	Session 2	Session 1	Session 2
Number of clusters	24	20	27	27
Number of children that completed products	135	137	160	187

Note. The pilot session is not included in these data.

The next three research questions also address product development, and procedures, analyses and results are discussed in relation to each research question.

Research Question #1C: What are the effects of the implementation of enrichment clusters on students' product development?

Research question #1C investigated the effect of enrichment clusters on student product development. After determining how many students produced products, it was necessary to determine what kind of products were completed, because enrichment clusters provide opportunities for both individual and group products. One hundred twenty clusters were offered during the pilot and treatment sessions in both schools. In 80% of these clusters, students produced products or services. In Treatment School A, 57 clusters were conducted, and students completed products or services in 49 of them. In School B, 63 clusters were held, and students completed products or services in 48 of them. Students usually completed products that were suggested by teachers or other students. Most products did not attain the high levels of quality that would be commonly found in a program for gifted and talented students for several reasons. The most compelling of these reasons was that the length of time required for truly authentic products to be developed was not available because of the limited time schedule given to enrichment clusters. Table 18 includes a sample of clusters and their products. Clusters offer the opportunity for the development of high level products and services, and the types of products in the first year of the clusters form a basis upon which higher level products might be developed in the future years of the enrichment clusters.

Similar numbers of group and individual products were completed by students in the enrichment clusters in both schools, as indicated in Table 19. The product assessment form, *SPAF*, was completed on a sample of products and chi-square analysis revealed no differences among frequencies of product development with respect to the type of product (group or individual) (x^2 [1, N = 173] = .10).

To further address research question #1C, multivariate analysis of variance (MANOVA) was performed on the two subscales of the *SPAF* ("process of product development" and "quality of product") to determine if there were differences in product quality between students who completed group products and those who completed individual products. The independent variable was group (group product and individual product), and the *SPAF* subscales were the dependent variables.

SPSS-X frequency and MANOVA were used for evaluating the assumptions, with no missing data or outliers found (N = 172). To reduce skewness, a logarithmic transformation for the process of product development subscale and a square root transformation for the quality of product subscale were performed. There was no sign of multicollinearity.

Because group size was unequal and homogeneity of variance-covariance was violated, Pillai's criterion was recommended, rather than Wilk's Lambda, for evaluating multivariate significance (Tabachnick & Fidell, 1989). However, in this case, the two *F* values were exactly the same. The main effect for group differences was significantly different on the combined dependent variables (F [2,168] = 3.69, $p<.05$, *ES* = .04). Because the omnibus test was significant, univariate *F*-tests were used as a follow-up examination with a Bonferroni adjustment. The result of the follow-up indicated that two univariate *F*-tests were not significant with a Bonferroni adjustment (see Table 20). This indicates that a combined supervariable maximized group differences which was not shown in the univariate tests (Tabachnick & Fidell, 1989). Table 21 shows group means and standard deviations on the *SPAF* subscales. With regard to the process of product subscale, students who completed individual products scored higher (M = 4.62) than the students who completed group products (M = 4.5, *ES* = .28), whereas on the overall quality of product subscale, students who completed group products scored higher, (M = 3.82) than the students who completed individual products (M = 3.76, *ES* = .19).

Table 18

Sample Types of Products or Services Produced in Enrichment Clusters

Cluster Title	Product/ service	Description of product or service
Young Entrepreneurs	yes	developed flyers, ads, and managed store
Creative Dance Troupe	yes	performance of original dance
Fanciful Puppetry	yes	puppets and original production for the school
Builders, Inc.	yes	developed model cities
Young Reporters' Club	yes	produced a school newspaper
Young Voices Ensemble	yes	performance of musical
Young Authors	yes	original creative writing published in a school magazine
Creative Dance Troupe	yes	talent show production
*Young Authors	yes	booklet of stories, poems, and jokes
*Young Artists' Guild	yes	personal portfolio, art displays
*Video Production Co.	yes	school video, commercials for school store
*Paleontologist Society	yes	papier mâché dinosaurs, drawings, stories, presentations
*Paleontologist Society	yes	research papers, stories
Engineering I	yes	experiment, creation of own games
Bluebirds	yes	built bird houses and developed habitat
School Newspaper	yes	production of a school newspaper
Origami Magic	yes	origami animals
Pen Pals	yes	wrote letters, followed Maya Quest
Pop-up Cards	yes	developed original pop-up cards
Create a Sculpture	yes	created individual sculptures
Sign Language	yes	communication in sign, began sign language club
You Are What You Eat	yes	developed meals for seniors
Paleontology Association	yes	presented dinosaur discovery to class
*Aviators/Flight School	yes	developed model planes
Chimers Handbell Choir	yes	performance for school and parents
*Computer Connection	yes	teaching others electronic mail
*Culinary Institute	yes	recipes and booklet
Decorative Artists' Guild	yes	stencils
*Young Firefighters Assoc.	yes	fire safety posters
*Forest and Wildlife Biologists' Society	yes	drawings and posters
*Future Farmers	yes	spun wool and wove bracelets
*Gamers Institute	yes	developed original board games
Invention Convention	yes	developed and presented original inventions
*Irish Society	yes	made Irish crafts and food
*Multicultural Society	yes	developed crafts and recipes from cultures
*NASA Exploratory Group	yes	made papier mâché solar system
*Puppeteers Workshop	yes	performance of puppet show with original puppets
*Ukrainian Artists' Guild	yes	developed original Ukrainian eggs
*Young Artists' Guild	yes	made stained glass creations
*Young Scientists' League	yes	created volcanoes
*League of Engineers	yes	designed and built structures
Horticulture Alliance	yes	landscape for school entrance
Poets' Society	yes	collection of original student poetry

Note. Clusters marked with an * met for 10 weeks.

Table 19

Frequency and Percentage of Group and Individual Product Development

Type of Product	Treatment School A	Treatment School B
Group	46 (58.2)	57 (60.6)
Individual	33 (41.8)	37 (39.4)

Note. Numbers in parentheses are percentages.

Table 20

Results of Univariate *F*-Tests for Two Subscales of *SPAF*

Univariate *F*	*Df*	*SS*	*MS*	*F*	*p*
The product development process	2	.04	.04	3.29	.07
The quality of product	2	.01	.01	1.59	.21

Table 21

Group Means and Standard Deviations on the *SPAF* Subscales

Group	Product Development Process		Quality of Product	
	M	*SD*	*M*	*SD*
Group product	4.50	.46	3.82	.24
Individual product	4.62	.36	3.76	.40

Note. A higher value indicates good process and high quality.

Research Question #6: How many students complete products in the enrichment clusters and what is the achievement level of students completing products?

To address research question #6, percentages of students from various achievement groups that completed products were calculated. In Figure 2, the percentage of students that completed products is depicted. This is followed by an analysis of student achievement with respect to product development, as indicated by teachers on the student roster. On the student roster, teachers indicated the performance levels of students on a 1 to 5 Likert scale in both math and reading (1 = low, 2 = below average, 3 = average, 4 = above average, 5 = superior). For this analysis, these two content area ratings were averaged to provide an overall achievement rating. A chi-square analysis indicated that there was no difference among achievement levels with respect to the number of products produced (X^2 [8, $N = 469$] = 7.33). Further analyses were performed which examined achievement in both math and reading with respect to product development; significant differences were found. In Table 22, the numbers of products developed in each school by average achievement level are displayed.

To further address research question #6, students in special programs were examined with respect to product development. In Table 23, product development by special program placement of students is summarized. These programs include Title I (TI), which is remedial math and/or reading; Gifted and Talented (GT), which is a pull out program for gifted students (approximately 5% of the population); Speech and Language (SL), which includes students who receive speech services; Special Education (SP), which includes students who receive special education services, but are mainstreamed into regular classrooms; and students who are not in any special program (NO). Chi-square analysis in which students in Title I, speech, and special education programs were combined to form one category, indicated that there are significant differences among the frequencies with which product development occurred among students in various programs (x^2 [2, $N = 459$] = 9.11, $p < .05$). Follow-up examination of the standardized residuals indicated that the differences in the cells are small with only one standardized residual exceeding +/-2.

Students who were not in special programs produced fewer products than expected, whereas students who were in special programs produced products at an expected rate. With regard to achievement and special program results, one point should be made about the special education students in these analyses: Even though there were over 80 special education students in one of the treatment schools, only students who were mainstreamed were included in the analysis. Those students who were not mainstreamed were low functioning and not able to participate fully in a cluster as defined by the model, although adapted clusters were developed for these students.

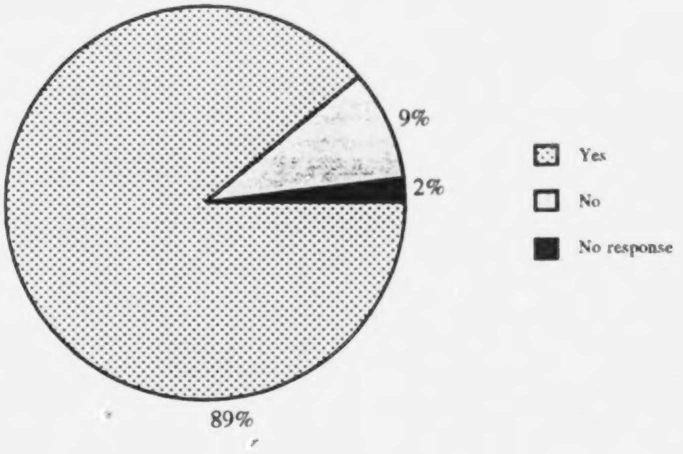

Figure 2. Percentages of students completing products.

Table 22

Number of Products Developed by School and Achievement Levels

Average Achievement Level	Treatment School A			Treatment School B		
	Yes	No	Total	Yes	No	Total
1 (Low)	4	2	6	7	0	7
1.5	4	0	4	9	1	10
2 (Below Average)	20	2	22	16	0	16
2.5	18	2	20	29	0	29
3 (Average)	94	16	110	59	2	61
3.5	28	8	36	25	0	25
4 (Above Average)	42	7	49	28	1	29
4.5	10	0	10	6	0	6
5 (Superior)	13	1	14	16	0	16

Note. Missing data from school A = 4 and missing data from school B = 9.

Table 23

Frequency and Percentage of Product Development by Special Program

Product	TI	GT	SL	SP	NO
	Special Program				
Yes	46(97.9)	46(100.0)	5(100.0)	22(91.7)	299(88.7)
No	1(2.1)	0(.0)	0(.0)	2(8.3)	38(11.3)
Total	47(100.0)	46(100.0)	5(100.0)	24(100.0)	337(100.0)

Number of missing observations = 23

Note. TI = Title program; GT = Gifted program; SL = Speech program; SP = Special education; NO = no program

As a follow-up to the previous analysis, which examined only the number of products completed by students with respect to special program placement, a multivariate analysis of variance (MANOVA) was performed to assess special program groups (independent variable) differences on the dependent variables of the two subscales on the *SPAF* ("process of product development" and "quality of product"). Groups were "gifted program," "no special program," and "other special program," which included special education students, remedial students, and speech and language students collapsed into one group due to the small numbers in each individual category.

SPSS-X Frequency and MANOVA were used to evaluate the assumptions with no missing data or outliers found ($N = 171$). To reduce skewness, a logarithmic transformation for the process of product development subscale and a square root transformation for the quality of product subscale were performed. There was no sign of multicollinearity.

Because group size was unequal and homogeneity of variance-covariance was violated, Pillai's criterion was used instead of Wilk's Lambda to evaluate multivariate significance (Tabachnick & Fidell, 1989). The main effect for group differences was not significantly different on the combined dependent variables ($F[4,326] = .24$, $p = .917$, $ES = .01$). Also, two univariate F-tests were not significant with a Bonferroni adjustment. This indicates that there were no significant differences among the groups of gifted students, students with no special programs, and students in other special programs (special education, Title I, and speech and language) with respect to process and quality of completed products. Group means are displayed in Table 24.

To further address research question #6, an independent t-test was performed to examine the difference between students who completed a group product and students who completed an individual product with respect to their achievement score. Using the *Student Roster Sheet*, teachers ranked students on their performances in math and reading from 5 (superior) to 1 (low). For this analysis, the achievement score is the average of each student's math and reading score from the *Student Roster Sheet*. The results, shown in Table 25, indicate that there were no significant differences between group products and individual products with respect to the achievement ($t[1,171] = -1.36$, $p > .05$). Students who completed individual products did have a slightly higher achievement mean

($M = 3.40$) than those who completed group products ($M = 3.21$); however; the difference was not statistically significant. Students who completed projects in groups were not significantly different with respect to teacher ranked math and reading achievement than students who completed individual projects.

Research Question #7: Does the quality of student products differ among students of various achievement levels?

To address research question #7, a regression analysis was performed between achievement as a predictor variable and the process of product development (the first subscale on the *SPAF*) as a criterion variable. A second regression was performed using achievement as a predictor and the second subscale from the *SPAF*, quality of product, as the criterion variable. Since students of all achievement levels participated in the enrichment clusters, we investigated whether differences existed among students of various achievement levels with respect to product process and quality. Analysis of the product process subscale was performed using SPSS-X regression after evaluating assumptions which led to log transformation of the criterion variables to reduce negative skewness in distributions. Table 26 displays the unstandardized regression coefficients, the standardized regression coefficients, and R^2 for process. R^2 for regression was not significantly different from zero ($F [1,170] = .03, p > .05, ES = .0002$); therefore, achievement is not a significant predictor of product development process scores on the *SPAF*. Regarding product quality, as a result of examining assumptions, it was found that the quality of product was negatively skewed. After square root transformation of the variable, a regression was conducted. Table 27 indicates that the result of the regression was not significantly different than zero ($F [1,170] = .65, p > .05, ES = .004$), indicating that achievement was not a significant predictor of product quality, as measured by *SPAF*.

Table 24

Group Means and Standard Deviations on the *SPAF* Subscales

Group	Process of product		Quality of product	
	M	*SD*	*M*	*SD*
No special program	4.55	.44	3.78	.31
Gifted program	4.56	.43	3.83	.47
Other program	4.57	.39	3.84	.17

Table 25

Summary of *t*-Test: Group vs. Individual Products With Respect to Achievement

Variable	*N*	*M*	*t*	*p*
Group product	102	3.21	-1.36	.174
Individual product	70	3.40		

Table 26

Regression of Achievement on the Process of Product Development

Predictor	Unstandardized Coefficient	Standardized Coefficient	*Df*	*F*	*p*
The Process of Product Development	.002	.014	1	.032	.86
Intercept	.140				
R^2	.002				

Table 27

Regression of Achievement on the Overall Quality of Product

Predictor	Unstandardized Coefficient	Standardized Coefficient	*Df*	*F*	*p*
The Overall Quality of Product	-.005	-.060	1	.65	.42
Intercept	1.96				
R^2	.004				

It should also be noted that the products which were rated were all scored very highly by both raters as indicated by the negative skewness in both factors of the *SPAF*. Many of the products in the first year of this program were not the authentic Type III products (Renzulli, 1977) that may be produced in future years as the cluster program becomes longer and more intensive. Additionally, numerous products were assigned by the facilitators and, therefore, were not student selected and not intended for an authentic audience. The excitement generated by the program, and the excitement of the raters of the *SPAF* forms, may have artificially inflated the results of the assessment, thereby providing a homogeneously high assessment of the completed products. It is with caution that these results should be interpreted. It is not our intent to imply that students of any achievement level can complete the same level products as more advanced learners. With these cautions, it is exciting to note that students of all achievement levels within all clusters can and do complete products that they enjoy and regard with pride. A cautious interpretation seems to be that when students of common interest work together toward the development of a product, achievement does not appear to predict the level of the process of product development or the overall quality of the resulting products.

Parental Attitudes

Research Question #2: What are the effects of the implementation of enrichment clusters on parental attitudes about school satisfaction?

A pre and post *Parental Attitudes About Enrichment Opportunities Questionnaire* was administered to experimental and comparison school parents. However, because the comparison school return rate was so low (9%), only the experimental group pre and post surveys were used for data analysis.

SPSS-X frequency and regression were used for accuracy of data entry, missing values and fit between their distributions and the assumptions of multivariate analysis. As a result of preliminary analysis, the total number of 221 surveys was reduced to 219 with the deletion of two surveys with missing data.

For the main effect test, a multivariate analysis of variance with repeated measure (MANOVA) was performed to examine the pretest and posttest differences on the two subscales of *Parental Attitudes About Enrichment Opportunities Questionnaire* as dependent variables. According to the theoretical and statistical judgment, factor 1 represents "Perceptions of Enrichment" and factor 2 represents "Satisfaction with Enrichment." Wilk's Lambda was used to determine statistical significance. Two univariate F-tests followed on each factor. With the Wilk's criterion, the main effect for pre/posttest was significantly different on the combined dependent variables (F [2,217] = 2501, 28, $p < .001$, $ES = .98$). This was followed by two univariate F-tests which were found to be significant (see Table 28) with a Bonferroni adjustment. A statistically significant difference between pre and posttest results from the treatment sites was found for both factors in the *Parental Attitudes About Enrichment Opportunities Questionnaire*. Parental perceptions of enrichment and satisfaction with enrichment improved after the intervention of enrichment clusters. Means for each school are included in Table 29.

Although these data show significant differences from pre to post, the results should be interpreted with caution. Due to lack of a comparison site, growth may not be attributed to the implementation of enrichment clusters. Although five months elapsed between the pre and post administration of the survey, pretest sensitization or history threats may have limited these findings. The experimental return rate of matched pre and post surveys was over 50% in both sites.

Table 28

Results of Univariate F-Tests for Two Factors of *Parental Attitudes About Enrichment Opportunities*

Univariate F	Df	SS	MS	F
Factor 1	1	1401.38	1401.38	5004.04*
Factor 2	1	1297.76	1297.76	2647.20*

* Significant $p < .025$ with Bonferroni adjustment

Table 29

Pre and Posttest Mean Scores on *Parental Attitudes About Enrichment Opportunities*

Score	School A	School B	Total
Pretest	3.69	3.83	3.77
Posttest	4.22	4.17	4.19

Teacher Practices

Three of the research questions in this study address the effects of enrichment clusters on the practices and attitudes of classroom teachers either in their classroom or in the enrichment clusters. In the section that follows, analyses and results related to the following are discussed.

Research Question #3: How do teachers in the groups differ with respect to their attitudes about the use of enrichment activities for students?

Research Question #4: Do teachers in the experimental sites use strategies learned in organizing enrichment clusters in their regular classroom teaching?

Research Question #5: In what ways is advanced content used in enrichment clusters?

The *Classroom Practices–Teacher Survey (CPS)* was administered to the experimental and control school teachers as a pre and posttest. However, because the comparison school teacher survey return rate was low and represented a biased sample (the principal indicated that those responding represented a partial segment of the faculty), only the experimental school surveys were used for data analysis. Within the treatment schools we compared the teachers who facilitated an enrichment cluster ($N = 19$) with those who did not facilitate a cluster ($N = 13$) with respect to their scores on the *CPS*.

Research Question #3: How do teachers in the groups differ with respect to their attitudes about the use of enrichment activities for students?

To address this research question, we investigated whether the teachers in the experimental sites who facilitated clusters differed in their use of various classroom practices from those teachers who did not facilitate a cluster with respect to pre and post measures on the *CPS*. Because the comparison school return rate on the survey was low, the following comparison was investigated. A multivariate analysis of covariance (MANCOVA) was performed to determine whether significant differences existed between the teachers who facilitated enrichment clusters ($N = 19$) and those teachers who did not ($N = 13$) on the total *CPS*. Both groups received staff development regarding enrichment clusters and both groups were involved in the clusters. Those who chose not to facilitate a cluster assisted community persons or instructional aides as they facilitated clusters.

A multivariate analysis of covariance (MANCOVA) was performed on three subscales of the *CPS*. Originally, the *CPS* had six subscales: Questioning and Thinking, Providing Challenges and Choices, Reading and Writing Assignments, Curriculum Modification, Enrichment Centers, and Seatwork. However, for this analysis, three subscales (Factor 1: Questioning and Thinking, Factor 2: Providing Challenges and Choices, and Factor 4: Curriculum Modifications) which were relevant to strategies learned in organizing enrichment clusters were used for dependent variables. The between variable was group: Enrichment Facilitated and Enrichment not Facilitated. SPSS-X frequency and MANOVA were used for evaluating the assumptions, with no missing data or outliers found ($N = 32$). To reduce skewness, a logarithmic transformation was performed for the posttest factor 1, and a square root transformation was performed for pretest factor 1 and for pretest factor 2. The homogeneity of variance-covariance assumption was met. The result indicates that there is no significant difference between groups on the combined dependent variables ($F[3,25] = 1.23, p > .05$). Tables 30 through 32 indicate the pretest and posttest means for each of the subscales in the analysis.

Research Question #4: Do teachers in the experimental sites use strategies learned in organizing enrichment clusters in their regular classroom teaching?

Teachers in the experimental sites used strategies they learned while facilitating clusters within their regular classrooms, as determined by qualitative analysis, through interviews, observations, and transcription of field notes with all of the teachers.

Table 30

Pre and Posttest Means for Groups on Questioning and Thinking

	Pretest Mean	Posttest Mean
Enrichment facilitated	4.19	4.29
Enrichment not facilitated	3.84	3.95

Table 31

Pre and Posttest Means for Groups on Providing Challenges and Choices

	Pretest Mean	Posttest Mean
Enrichment facilitated	1.63	1.68
Enrichment not facilitated	1.56	1.54

Table 32

Pre and Posttest Means for Groups on Curriculum Modification

	Pretest Mean	Posttest Mean
Enrichment facilitated	2.68	2.81
Enrichment not facilitated	2.49	2.39

When asked if the enrichment clusters influenced what occurred in their classrooms with respect to either methods or content, teachers in the treatment schools responded as indicated in Table 33. Thirteen teachers out of a total of 22 teachers in Treatment School A and 8 of 14 teachers in Treatment School B indicated that strategies they employed or learned while facilitating enrichment clusters carried over into their classrooms. These teachers went on to describe whether the influence was related to content or methodologies or both. Overall, 59% of the teachers in Treatment School A and 57% of the teachers in Treatment School B said that they modified what they did in their classrooms as a result of their involvement with the enrichment clusters. These teachers had not been asked to modify practices in their classrooms, yet over half did so by integrating practices that they used in the enrichment clusters. Treatment School A had only 15 enrichment clusters sessions and Treatment School B only 13 sessions, yet over half of the teachers indicated that they voluntarily changed their teaching as a result of this involvement in enrichment clusters. This is an encouraging finding which indicates how much teachers were influenced in their teaching practices by a relatively short intervention.

After determining the degree to which each classroom teacher believed that the clusters had influenced his/her classrooms, we examined the ways in which teachers modified their classrooms and teaching as a result of their involvement in the clusters through the qualitative data collected. Specifically, the influences on teachers' classrooms as a result of enrichment clusters fell into two categories: Content and Methods.

Table 33

Frequency of Influence of Clusters in the Classroom by School

Question	Treatment School A		Treatment School B	
	Yes	No	Yes	No
Have clusters influenced what you do in your classroom?	13	9	8	6
If Yes,				
With respect to content?	13		5	
With respect to teaching methods?	10		8	

Content

Content included areas such as the development of centers related to cluster content, the integration of cluster content into the classroom curriculum and lessons, and the use of ideas and community resources gained from the clusters within the classroom. Across both sites, teachers reported that they had developed and used interest centers as a direct result of their connection with the clusters. Nine teachers reported that they integrated cluster content into their classrooms, and four said that they had involved community members and outside resources from the clusters in their classrooms. Specific examples of these strategies include: using materials developed in the forestry cluster; using content, resources, and speakers from the paleontologist cluster; and integration of concepts from the foreign language and sign language clusters. The facilitator of the *History of the Motion Picture* cluster explained: "As a result of our cluster, we developed an interest center in the library that was filled with the old movies we studied in the cluster. Students from the cluster and others from the school who heard about the cluster or who had an interest in old movies could check out the movies and watch them at home." Students were able to check out videos of old classic motion pictures to view at home. In this way, he influenced students in other classrooms as well as his own students and cluster members. An art teacher reported that she was able to use interests created in the clusters in her regular art classes and to build upon art concepts that students learned in the clusters. She explained, "Students in the cluster were so excited about what they were learning that it was a logical extension to integrate things like calligraphy and drawing into the regular art curriculum." Further, three other teachers stated that the enrichment clusters influenced the content in their classrooms because students brought back ideas and knowledge which they were able to integrate into their classes. For example, students who had been working on-line in their computer cluster showed their classmates how to access the Internet and send electronic mail. Even though enrichment clusters are designed to focus on student and teacher interests, and not necessarily relate to the prescribed curriculum, our analysis indicated that they had a positive impact upon the content and curriculum in the classrooms of over half of the teachers who participated in this study.

Methods

Teaching methods were also influenced by the enrichment clusters. Teachers reported several experiences which influenced their practices, including responding to student interests, using hands-on activities, encouraging student directed learning and choices, using interest groups in the classroom, encouraging students to complete products and independent work, and increasing concentration on thinking skills.

Nine teachers reported that they now encourage students to pursue interests more in their classrooms. As one teacher explained: "After working in the clusters, I felt more free to offer students options based on their interests in my classroom. I also think that the students were more likely to want to take off in directions of their choosing." Not only did these teachers learn more about the students' interests, but they also reported that students learned more about the teachers' interests, which provided a more personally meaningful educational experience for both. Teachers reported addressing student interests by using interests as a basis for lessons and projects as well as using interests for grouping children within their classrooms. Another teacher explained, "Now when students finish their work early, I ask them what they'd like to do."

Four teachers said that they currently use more hands-on activities such as experiments, building, videotaping, acting, dioramas, and student exploration more often than before the clusters. As observed by one teacher: "The students enjoyed the hands-on activities in the enrichment clusters, so I've tried to allow for more hands-on learning in my classroom."

Encouraging student direction and choice was reported by five teachers. This involved trying to facilitate rather than teach in the following ways: promoting choices of projects, allowing choices of group members (often those with similar interests), and encouraging choices of roles within the classroom.

Three teachers reported that they now use interest groups within their classrooms and that these groups are often centered around a project or theme. Grouping by interest worked so well in the clusters that it was a logical extension for these teachers to continue to use it in their classrooms. As one facilitator explained, "The students enjoyed working with others who shared their interests, so I group by interest more often in my classroom."

Encouraging students to develop products, projects, and to work independently was indicated as an outcome of their cluster by six teachers. These teachers reported that their students seemed to be excited about their products from the clusters and, therefore, they decided to integrate more opportunities for products and projects of students' choices in their classrooms. One teacher said that instead of assigning book reports, she gave students the option of developing products related to their language arts readings. As a result, students developed critiques, commercials, videotapes, skits, and advertisements related to their reading assignments, all of which the teacher was pleased to report were of the highest quality. The spill over of cluster-type products into the regular classroom was a positive outcome of teachers' involvement with the enrichment clusters.

Two teachers indicated that they also concentrated more on thinking skills, including problem solving, critical thinking, and creative thinking. One teacher who was interviewed indicated that when facilitating the paleontologist cluster she had been amazed at the advanced level of work and thinking within the cluster.

> I was surprised by how motivated the students were to tackle the difficult concepts that were presented to them in this cluster. Some of my own students were in the cluster, and after watching them in that setting, I've decided to expect more from them in class. The hands-on nature of the cluster coupled with the higher order processes were motivating to my students.

A summary of the content and methods used by teachers in their classrooms is displayed in Table 34.

Other Teachers

While 58% of the teachers indicated that the clusters had directly influenced their classrooms, 42% indicated that their teaching had not been directly changed. Yet, several of these teachers qualified this response. For example, two teachers said that the enrichment clusters were too new and therefore had not *yet* influenced what they do in their classrooms, while another teacher said that the clusters did not influence her work in the classroom because of current curricular constraints. One teacher said that she believed she had been teaching like a cluster facilitator for years and that it was "nice to have the opportunity to focus on this type of teaching and not have to hide it." Two others said that they already use strategies such as those used by cluster facilitators, and therefore the clusters had not directly influenced what they do in their classrooms because . . . "they're already doing it." Accordingly, of the 15 teachers who said that the enrichment clusters had not had an influence on their classroom content or teaching methods, 5 qualified their remarks. Considering the relatively short treatment, it is clear that the enrichment clusters had a spill over effect into many of the teachers' classrooms. (Refer to Appendix K for facilitator interviews.)

Table 34

Enrichment Cluster Content and Methods Used by Teachers in Their Classrooms

Description	Number of Teachers
Content	
Integrating cluster content into classroom curriculum and lessons	9
Using ideas and community resources gained from clusters	4
Developing centers related to enrichment cluster content	3
Methods	
Responding to student interests	9
Encouraging student directed learning and choices	5
Encouraging students to complete products and independent work	6
Using hands-on activities	4
Using interest groups in the classroom	3
Increasing concentration on thinking skills	3

Research Question #5: In what ways is advanced content used in enrichment clusters?

Results indicated that from the pilot session to the first and second treatment sessions of enrichment clusters, the use of advanced content increased.

Several categories which provided evidence of advanced content in the enrichment clusters emerged as a content analysis of the activities that occurred during the clusters was conducted. The use of advanced content was documented through content analysis procedures as described by Gall, Borg, and Gall (1996, pp. 358-361) using facilitator evaluation questionnaires. All of the 120 clusters were assessed for the use of advanced content and methodology. In 114 clusters, facilitators indicated that they used advanced content and methodologies in at least one of the categories listed in Table 35.

Ninety-five percent of the cluster facilitators indicated that they used new concepts considered by the facilitators to include advanced content. To explain the breadth of use of advanced content, the following examples are presented. Students in the language clusters (*Sign Language, The French League, The Spanish Group, The Latin Association*) learned new words in the language, as well as information about the customs and lifestyles of people from other cultures. Theater clusters (*Puppetry, Young Voices Ensemble, Talent Productions, Inc., Bravo! Children's Theater*) introduced students to acting, staging, and directing. Science clusters (*Paleontologist Society, Young Scientists, SOS Project Recycle, Engineering I, Snakes in the Grass, Bluebirds, Forest and Wildlife Biologists, Invention Convention*) covered content rarely found in traditional elementary curriculum. Dance and movement clusters (*Spring Training, Creative Dance Troupe, Tap Dance Association, These Boots Were Made for Walking*) introduced the cultural influence of the dances as well as new steps and the impact of exercise on the body. Clusters which dealt with arts and crafts (*Young Artists Guild, Creative Design, Young Crafters Guild, Create a Sculpture, Arts and Threads*) introduced students to special mediums and content relevant to their work. Students in clusters that focused on writing (*Young Authors, School Newspaper, History of the Motion Picture, Poets Society*) learned new genres of writing as well as techniques for generating the written word and editing. Students who elected technology clusters *(Video Production, Co., Computer Drawing, Lights, Camera, Action, Computer Connection)* learned about equipment and its use in the real world. Professional clusters (*Police Academy, Young Reporters, Mr. Frank's School Improvement, Horticulture Alliance, Culinary Institute, Dairy Farming, Future Farmers, Pilots, Inc., Young Firefighters, NASA*) learned about people in these professions and the essential information they need to know to do their work. In summary, 95% of the cluster facilitators introduced new concepts and advanced content to the children who participated in them.

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Table 35

Advanced Content and Methodologies by Frequency and Percentage of Use by Cluster Facilities

	Strategy	Treatment School A (*N* = 57)	Treatment School B (*N* = 63)	Total (*N* = 120)
1.	Introduction of New Concepts and Advanced Content	52 (91)	62 (98)	114 (95)
2.	Development of Product or Service	49 (85)	48 (76)	97 (81)
3.	Teaching Specific, Authentic Methodologies	40 (70)	48 (76)	88 (81)
4.	Use of Advanced Vocabulary	39 (68)	39 (62)	78 (65)
5.	Use of Authentic "Tools" Related to the Topic	27 (47)	40 (63)	67 (56)
6.	Use of Advanced Resources and Reference Materials	25 (44)	38 (60)	63 (53)
7.	Use of Advanced Thinking and Problem Solving Strategies	26 (46)	27 (43)	53 (44)
8.	Integration of Creative Thinking	24 (42)	27 (43)	51 (43)
9.	Integration of Historical Perspectives	14 (24)	15 (24)	29 (24)
10.	Development of Presentations or Performances	9 (16)	7 (11)	16 (13)
11.	No Advanced Content Used	5 (9)	1 (2)	6 (5)

Note. Numbers in parentheses are percentages

With regard to the development of products or services; a majority of the cluster facilitators in both schools used student products and services as the outcome of the clusters. Overall, in 80% of the clusters offered during the pilot and treatment sessions, students developed products, performances, and services. In all of the clusters that ran for 12 weeks (Treatment School A) or 10 weeks (Treatment School B), products were developed. This suggests that if clusters are offered over a longer period of time, it is more likely that student products and services will result. In the shorter pilot series of only three sessions, student products were developed in 85% of the clusters in Treatment School A and in 71% of the clusters in Treatment School B. The development of products and services provides further evidence of the use of advanced content in the clusters. For example, students in the *Paleontology Association* cluster researched attributes of dinosaurs, developed their own dig, discovered a new dinosaur using the content that they had learned, named and described their new dinosaur based upon its attributes and adaptations to the environment from which it came, and finally, developed and presented their findings in an analytical research paper during a mock scientific forum. The teacher who assisted the professionals who facilitated this cluster explained:

> At first I thought that the materials and the expectations of the facilitators were beyond the students' capabilities, yet as the cluster continued I was amazed at how well students did with the advanced nature of the cluster. And they were very enthusiastic about their projects.

She indicated that students were able to use mediums and materials including videos, artifacts, papers, articles, and actual paleontologists. As the teacher observed, "The quality of the students' work was truly extraordinary, and their products were very advanced for second through fifth grade students."

The use of specific, authentic methodologies in many clusters provides further evidence of the advanced nature of these clusters. Methodologies included the "how to" skills that people in given areas of interest need to know to do what they do, and these methodologies were consistently used by cluster facilitators. For example, children in the *Capture the Spirit* cluster learned how to use a camera in order to work effectively as a photographer and develop photographic essays. Children in the dance clusters learned how to dance, how to create dances, and how to perform. Participants in the arts and crafts clusters learned how to quilt, how to draw, how to do calligraphy, how to stencil, and how to develop a sculpture. Students in the *Invention Convention* learned how to invent by first identifying a problem, suggesting solutions, developing ideas, and proposing solutions on paper, followed by building a prototype of their actual invention—exactly the way real inventors work. Students in the *Police Academy* and *Detectives* clusters learned how to interview witnesses, how to document evidence, and how to take finger prints in their efforts to solve crimes. Students in clusters which included performance or production aspects learned how to prepare and perform in front of an audience, much as would real actors, musicians, puppeteers, and dancers. Evidence of integrating authentic methodologies related to the cluster topics existed in approximately 75% of the clusters.

Many students learned advanced vocabulary as a result of their involvement in the enrichment clusters. Introduction of advanced vocabulary directly related to the content of the cluster was found in 65% of the clusters. For example, students in the *Horticultural Society* and the *Horticultural Alliance* learned Latin names for the plants, parts of the plants, the concept of germination, and many other words that people involved with horticulture and landscaping use on a regular basis. The resources for both of these clusters were on a reading level above most of the students, yet the students were able to handle the vocabulary and the Latin because of their specific interest in the topic. During one observation, a student in this cluster asked another student if she could go get the *Ilex Subulata* so that she could use the trowel to plant it before its root stock dried out. The nature and the varied topics of the clusters provided the opportunities for introduction and use of advanced vocabulary in authentic settings. Vocabulary, when it is meaningful and tied to student interests, can be advanced and challenge the students to learn beyond what might generally be expected. This type of challenging vocabulary was used consistently in the enrichment clusters.

An additional area that emerged as evidence of advanced content was one that included the introduction and use of tools needed to accomplish tasks within the cluster. These tools were specific to the nature of the cluster, such as tools necessary to perform or act like a practicing professional within the interest area addressed by the cluster. For example, students in the *Invention Convention* cluster learned to use drafting equipment to make scale drawings of their inventions, as well as use saws and hammers when constructing their actual inventions. Students in the *Young Entrepreneurs, Young Reporters,* and *Talent Productions* clusters learned to use computers, design copy, and develop and lay out advertising. Photographers and videographers learned to use the camera and camcorder, as well the editing equipment. Students in the arts clusters such as *Create a Sculpture* and *Ukrainian Artists Guild* learned to use files and styluses, the tools of each of these trades. Students involved in the *Culinary Institute* cluster learned to use the tools within the kitchen which related to the types of cooking that they were doing. In the *Spring Training* cluster, students used stethoscopes, heart monitors, and equipment to measure body fat and blood pressure. Over 50% of the cluster facilitators integrated the use of tools specific to the topics and tasks within the clusters.

Facilitators in 55% of the clusters used advanced resources and reference materials with the students, including videos, cassettes, magazines, slides, on-line computers, films, technical papers, artifacts, centers, blueprints, books, speakers, and field trips to challenge students and capture their interests. Students in the *Paleontologist Society* listened to an expert paleontologist, viewed videos, read books and technical papers, and observed artifacts, and as a result learned classification and identification by categorizing their "finds" in relation to standards within the field of paleontology. They applied their newly acquired knowledge to develop their own technical reports and models. After an inventory by the facilitator regarding what they wanted to draw, the *Young Artists'* facilitator brought in examples of work by artists and the needed equipment such as quill pens and ink, French curves, calligraphy pens, and sketching pencils, and an expert demonstrated their use to the students. The facilitator stated that using authentic resources such as experts, equipment, and the sample work from artists was not possible within the regular art curriculum due to time and space constraints. She reported that as a result of this in-depth exposure, the students in the cluster were able to work at a much more advanced level. The use of advanced resources and reference materials evident in so many of the clusters provides support for the advanced nature of many of the enrichment clusters.

Advanced thinking, problem solving, and creative thinking were evident in many of the enrichment clusters in both treatment schools. For example, 44% of the cluster facilitators reported the use of advanced thinking and problem solving. Another 43% of the facilitators reported the use of creative thinking during the cluster sessions. Students in *Dioramas* used thinking strategies and problem solving each time they developed a new diorama. They had to decide upon the subject of the diorama, then develop a building plan complete with a materials list. This was followed by assembly and trouble shooting as the project was constructed. These students did not stop with the finished product, but went on to select a place to display their diorama. Two were displayed in the school, and the third project was displayed in City Hall. Students in *History of the Motion Picture* used critical thinking to create movie reviews and recommendations for others in their schools. Additionally, they used creative thinking when they developed promotional posters for the movies they viewed. *Talent Productions* members used advanced thinking and creativity to organize and set goals for creating talent show advertising. They also brainstormed ideas and planned and created products to advertise the show. Thinking skills were also present within the content and context of many of the clusters. For example, in the *Invention Convention* cluster, students had to use problem finding, problem focusing, and problem solving skills, and in the *Horticultural Society,* students had to use creative thinking skills in order to conceive and develop a landscape plan for the entrance to the school building.

Another area which emerged in the analysis of the use of advanced content was the integration of the historical perspectives of the cluster topic within the context of the cluster. Approximately 24% of the cluster facilitators reported that they had addressed the history of the content area of their clusters. Clusters on puppetry discussed the history of puppets with the students. The history of sign language was reviewed for those students who were learning to sign, which provided a better perspective regarding the existence of sign language today. Students involved in the *Paleontologist Society* cluster learned about earth history and theories of extinction, and students in the *Latin Association* cluster learned about the history of language and of culture as they discovered Latin as a root of modern language. Tap dancers, quilters, calligraphers, storytellers, chimers, and colonial artists all explored the history of their arts as they learned how to recreate arts from times past. The integration of history within the clusters offered students opportunities to explore the roots of the disciplines of their clusters while learning new techniques and concepts related to their chosen areas of interest. Historical perspectives provided authentic grounding in many clusters.

Performances and presentations were used in several clusters, which was one indication of advanced methodology and content. Some of the performances done by cluster students were for large audiences and others were organized at the classroom level, but all reflected the work and pride of the children involved in the presentation of their work. Students in several clusters such as *Creative Dance Troupe* performed original dances that they had developed and choreographed for their schools, and two routines were part of talent show performances for larger audiences during the evening. Students in the puppetry clusters developed their own puppets and scripts, and produced a puppet show for their classmates, parents, and teachers. *Young Voices Ensemble* and *Chimers Handbell Choir* members performed for their schools. In 16 clusters students were involved in performances and presentations. (Refer to Appendix L for facilitator interviews.)

CHAPTER 4: Implications and Suggestions for Future Research

This research study indicated that one type of pedagogy often used in gifted education programs can be extended to students who are not usually included in special programs for talented students. The students who benefited from this research study were from urban areas. Many were poor, had limited English proficiency, and had been repeatedly involved in remedial education programs. In one school, over 80 students were involved in special education programs and were bussed to this school because of its physical accommodations for students with disabilities. During the cluster program in this specially designated time in school, everything changed. Students left their classrooms and in a minute or two sped joyfully down the hallways to another room and another adult, one they had picked because of the topic being addressed and the adult offering the cluster. Their evaluations of the program were extremely positive, and indicated that enrichment clusters foster excitement about learning and demonstrate the benefits of schoolwide enrichment for all students.

It should be noted that this cluster program was organized with minimum effort and minimal costs, and that the greatest challenge to implementing the program was finding a common block of time for all teachers and students to be able to participate in the program.

Most teachers genuinely seemed to enjoy facilitating the clusters and they did not seem to regard it as just another preparation. Interviews indicated that the teachers looked forward to having an opportunity to share their interests with students who have similar interests and learning styles.

The implementation of the cluster program also resulted in the recruitment of many parents and community members into the school in roles that many of them had not previously been involved in pursuing. Many parents who coordinated or assisted in a cluster had either not been active in the school before or had simply helped in clerical roles or as a baker, driver, or stapler. This role allowed parents to share talents, areas of expertise, hobbies, and special abilities, and many of them were excited and delighted to be able to have their children's teachers know them in a different way. The same was true for many community members who facilitated clusters. Several of them had not had opportunities like this before and were delighted to try to bring their special talents into the school. It was exciting to observe the community involvement from churches, clubs, service organizations, and other associations.

The measures we used to assess parents' enthusiasm and parental attitudes about enrichment demonstrated significant gains from the beginning of the school year to the end of the period after the implementation of the cluster program. Letters, notes, phone calls, and communication with teachers and researchers all indicated the success of the program. Parents often called and indicated that although their child was ill, he/she would not stay home from school on a cluster day.

The urban schools that implemented this program served as models for other schools that were interested in implementing the cluster program or various components of schoolwide enrichment. Due to professional development opportunities that were presented by NRC/GT staff throughout the geographic area and reports in area newspapers, news of the cluster program spread and similar programs were implemented in other schools. At least seven districts that visited these pilot schools modeled their new cluster program on visits to the two urban districts that participated in this research.

As mentioned in Chapter 3, the implementation of enrichment clusters also affected teachers' use of enrichment strategies and use of advanced content. The use of advanced content in their enrichment clusters was a byproduct of the nature of clusters, the opportunity to delve into advanced issues and content based on the mutual interests of both children and adults. For example, the introduction of new concepts and advanced content by 95 % of the cluster facilitators was both gratifying and somewhat expected given the design of the clusters, but the addition of a number of other strategies for providing advanced opportunities was higher than we had hoped for or expected. These included (in decreasing frequency of use): the development of a product or service by the facilitators; the teaching of specific, authentic methodologies; the use of advanced vocabulary; the use of authentic "tools" related to the topic; the use of advanced resources and reference materials; the use of advanced thinking and problem solving strategies; the integration of creative thinking and historical perspectives; and the development of presentations or performances. It would appear that, given the frequency with which these advanced strategies were used within the clusters, some transfer would occur from cluster to classroom, and that is exactly what we found in our interviews with teachers and in our observations. As indicated in Chapter 3, many teachers reported that they began using the strategies used in their cluster in their classrooms. It appears that some of the standard differentiation strategies that we advocate in gifted education can be used by classroom teachers who have received opportunities to use these strategies in a situation like clusters. This professional development opportunity was also clearly demonstrated in the continued improvement of cluster content and offerings. The more time that teachers had to work on their clusters and to experiment with this more inductive way to teach, the more advanced the content and the more diverse the products and services became. Based on previous findings of Classroom Practices Studies by Archambault et al. (1993) and Westberg et al. (1993), it would appear that the opportunity to teach in a cluster program may result in much higher levels of use of differentiation strategies by classroom teachers in their own classroom teaching situations. The implementation of enrichment clusters may then provide a dual opportunity: high-end learning opportunities for all children, and professional development for teachers in differentiation strategies and enrichment learning and teaching.

Students' content area interests also showed differences when compared to students in a comparison school. For example, girls in the schools that implemented clusters had higher interest in the area of language arts than comparison girls. Boys involved in the treatment school had higher interest in the areas of math and science than boys in the comparison school. These findings may indicate that, although students may have selected topics by gender based on their interests, these interests intensified as a result of their involvement in the clusters.

A wide variety of different products was completed by most students who participated in the cluster program and no differences were found in the frequency of products completed by either ethnicity group or achievement group. Products differed by level of complexity when compared with products that have traditionally been completed by talented students in an enrichment program based on a model like the Enrichment Triad Model (Renzulli, 1977). Teachers and facilitators who had participated in this program had been excited about clusters and all tended to rate products highly, which had an impact on this study by giving an inflated picture of the overall quality of products produced by students in the clusters. This may imply that the products were of the absolutely highest quality with little room for improvement which was not the case. The products were plentiful, and the raters were excited about them, but few approached what one might expect to see in a gifted program where a student spends a considerable amount of time investigating a real problem in which they have intense interest. Training should be provided to discuss how evaluation can be used to increase product quality in future use of this strategy of product evaluation. This process should be keyed to helping cluster facilitators delve more deeply into the process of making some products more differentiated for talented students, which would, of course, require much longer periods of concentrated work than the six or twelve week programs that comprised the time period for these clusters.

Suggestions for Future Research

The following suggestions for future research emanated from this study. First, we implemented this research in a relatively short time period. If schools had longer periods of time to prepare for the program, we would have welcomed the opportunity to implement clusters for a longer time, both within the day and for a longer period of weeks or months.

We are also interested in investigating the effects of the use of the professional development module consisting of a videotape and a manual that was developed in this research study. We will be addressing this in future studies by the NRC/GT. The impact of cross age grouping on the high ability or high achieving students within these clusters could also be studied. In some clusters, precocious primary grade students were able to work on the same content with third or fourth graders. Both they and their parents seemed delighted with this opportunity, and more formal research might lead to interesting implications of this simple way to achieve cross grade interest grouping.

The implications of enrichment clusters on traditionally identified gifted and talented students should also be considered. The intent of this study was to investigate the use of enrichment on all students; however, it would be interesting to note the differences in content or advanced work that may occur if some clusters were designated as extremely advanced and if homogeneous grouping was used in one or two clusters to limit participation to students who had demonstrated talents in those areas, such as an advanced science, math, or literature cluster. Also, the length of time that a cluster would have to be held to have it provide the true opportunity for some talented, creative, and motivated students to pursue what have been traditionally called Type III investigations (Renzulli, 1977) should be studied. In other words, the use of authentic problems in clusters and their natural follow-up in advanced investigations would make an interesting research study.

The impact of clusters or other types of enrichment learning and teaching as professional development over time should also be studied. We were surprised at how many teachers began using the strategies they employed in their clusters in their regular classrooms. It would be fascinating to follow this in a longer, more intense qualitative study. In the same way, it would be interesting to investigate how a program like this may affect the entire climate of the school over a period of time, and the effects on students who are involved in remedial services or special education over time. It would also be interesting to study the interaction of a traditional gifted program and a continuum of services for talented students with the cluster program.

The optimum time period for clusters should also be investigated by research. We know that three weeks was too short a period, and that 12 weeks was too long a period for some students to remain in a cluster. Future research may concentrate on how long will average achieving students want to continue in a cluster (if that cluster is authentic and focused around student interests, there may be no limits), and of course, on the interaction of interests and abilities that guide their choices.

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Appendix A

Cluster Invitation

Memorandum

TO: All Interested Parents, Teachers and Board Members
FROM: Carol Moran, Enrichment Specialist
RE: **Invitation to Organize an Enrichment Cluster**

As you may know, the Enrichment Team and (_______) School are organizing a series of enrichment clusters. We hope you will be interested in submitting an idea for an enrichment cluster which will include multi-aged groups of students who share a common interest with the person organizing the cluster. The main rationale for participation in a cluster is that students and presenters want to be there. Students will select one cluster which they will attend beginning with a three session pilot series to be scheduled before the holidays. After the pilot, a longer series of Enrichment Clusters will be organized beginning in January. Selection of an enrichment cluster will not be a random or spontaneous process. Interest assessment procedures, examples of previous positive involvement in curricular or nonschool activities, and highly positive reactions to selected interest development activities may be used to help young people make decisions about which enrichment cluster they might like to select for given periods of time.

Enrichment clusters are organized around major disciplines, interdisciplinary themes, or cross-disciplinary topics (e.g., an electronic music group or a theatrical/television production group that includes actors, writers, technical specialists, costume designers). Enrichment Clusters will be connected in various ways to the regular curriculum already offered. Remember, you don't have to be the "expert" in this. You and your students can learn more about the topic together as you consider the type of cluster you might organize.

Sample descriptions of enrichment clusters are provided on this page and the next page to help you decide the type of cluster you might like to organize. Your own description may be very different from these samples.

We hope the descriptions below will help guide you in your organization of an enrichment cluster. If you are interested (and available) to organize an enrichment cluster, please complete the enclosed form. We hope you'll join us in this exciting opportunity for our students. Thanks!

Sample Clusters

WHALES AND WAVES
Welcome to the world of the humpback whale. Join us as we set sail on a scientific expedition to learn more about this endangered animal. We will learn some navigation skills, sailing techniques, and survival skills as we become shipwrecked on a deserted island and visit the windiest place on earth. We will discover how scientists explore the natural world as we visit with them at work.

CHEMISTRY
This class will provide students with the opportunity to study solids, liquids, and gases. They will conduct test experiments on dissolved oxygen chlorides, chlorine, and iron. They will learn about the physical and chemical properties of water. They will develop an understanding of acids, alkalines, and pH gases, and will have experience with chemical testing of rocks, minerals, and gasses.

(continued on next page)

VIDEO PRODUCTION

Lights! Camera! Action! What happens behind the scenes of movies and T.V. shows we watch? This course offers an opportunity to learn the basics of film and video production through hands-on activities from script writing to producing a video program. We will enhance our writing, speaking, and acting skills, and also learn the technical skills of the studio equipment.

MYTHS AND LEGENDS

In this enrichment course, we will sample the myths and legends that people have told to entertain themselves, to explain mysteries of nature, or to honor their heroes and heroines. While reading these stories, we will focus on the cultural similarities and differences of the people of the world and our ancestors. We will write myths, legends, and sometimes perform skits.

COMPUTER PUBLISHING

Students will learn the proper method of keyboarding. They will also learn word processing skills through the writing of articles for the school newspaper. (Students will increase their awareness of current events, news, and newspapers.) An issue of a school newspaper may be published by the class.

MATH DISCOVERIES

Math Discoveries will encourage, enhance, and expand our mathematics experiences through large group sessions, small group activities, games, and stations. Enrichment activities are provided to learn problem-solving skills in estimating, graphing, geometry, and logic. Many activities are done in cooperative groups.

ARTISTS AND IMAGINATION

What's your favorite method of creating art? Who's your favorite artist? Let's learn about artists whose style and techniques have made them famous. Then, using your own interpretations, create a work of art, experimenting with various methods and materials.

PAINTING AND DRAWING

We will expand students' drawing and painting knowledge and skills using realistic images and imaginations while working in a variety of mediums. Students will be exposed to several artists' works from various cultures.

CONSTRUCTION TECHNOLOGY

We will become familiar with the principles of construction technology through experimentation. Paper structures such as towers will be built to demonstrate constructive applications and space relations. Bridge construction, using other mediums, will be studied and students will build their own bridge structures.

YOUNG INVENTORS' FAIR

The process of invention is taught as a vehicle for expressing creativity which is both satisfying to the student and beneficial to society. Students, with the help of parents and their teacher, will create an invention individually or with a partner. The final product may be entered at the Young Inventors' Fair.

GOVERNMENT AND THE LAW

Government and the Law is designed for upper elementary students. The children are given the opportunity to express their individual views on "law and order" through various activities such as role-playing, skits (on vandalism, shoplifting, employee theft, buying stolen goods), discussions, and writing projects. All students learn about the three main branches of the government and why we have each of them. They identify their state senators and representatives and, after discussing pertinent issues, write to their legislators. The course's culmination is a mock court trial.

Community Members: Share Your Talent With Local Students

- **Work with small groups of children**
- **Choose a personal interest or skill to share**
- **Team up with a friend**
- **Gain community exposure**

What: Enrichment Cluster Program
Who: Small groups, grades K-5
When: 1 1/2 hour/week, January through March '95
Where: School

We are interested in providing authentic enrichment experiences for local students. A recent interest survey shows that these students want and need art experiences.

This program is one component of Renzulli's Schoolwide Enrichment Model. It is offered through the Gifted and Talented department at UConn.

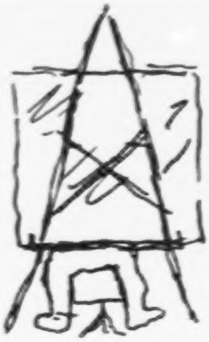
Topics Most Needed:

- Inventions/Technology
- Dinosaurs & Fossils
- Animal Behavior
- Astrology
- Mineralogy
- Art Projects
- Cartoons
- Dance/Music
- Magic
- Math Games
- Chemistry
- Toy Construction
- Holidays

Deadline: Dec. 21st

Questions?
Need an Idea?
Interested in signing up?

For more information
Call Carol Moran to sign up to facilitate your own Enrichment Cluster.



EnrichmenT CLUSTER

– Response Form –

Name ____

Address ____

Daytime Phone ____________________ Evening Phone ____________________

Name of Proposed Cluster ___________________________________

Description of proposed Enrichment Cluster (2-4 sentences)

Brief biography of Enrichment Cluster teacher for inclusion in brochure (1–2 sentences)

Age level of students preferred for Enrichment Cluster ____________________

Minimum number of students needed in the Enrichment Cluster ______________

Maximum number of students needed in the Enrichment Cluster ______________

Appendix B

Parental Attitudes About Enrichment Opportunities

PARENTAL ATTITUDES ABOUT ENRICHMENT OPPORTUNITIES

Please complete the following: Name:________________________________

I am the child's ____Mother ____Father ____Guardian ______ Child's grade

Following are ten statements. Please respond to them by circling the number that best represents your answer, using this scale:

1 Always
2 Often
3 Sometimes
4 Seldom
5 Never

For the purposes of this questionnaire, **enrichment** is defined as planned experiences beyond regular classroom work designed to enrich your child's education. Examples include speakers, videos and interest-based activities that extend learning.

1. My child has opportunities for enrichment experiences in school. **1 2 3 4 5**
2. During school my child is encouraged to develop and pursue her/his talents. **1 2 3 4 5**
3. My child develops projects in the classroom that reflect her/his interests. **1 2 3 4 5**
4. My child has opportunities to work with other students in his/her classroom who share common interests. **1 2 3 4 5**
5. My child's school offers enrichment opportunities for all students. **1 2 3 4 5**
6. My child enjoys the enrichment opportunities in his/her school or classroom. **1 2 3 4 5**
7. My child is happy about attending school. **1 2 3 4 5**
8. I am informed about the educational enrichment activities for my child at school. **1 2 3 4 5**
9. I have the opportunity to become involved with enrichment opportunities in school. **1 2 3 4 5**
10. I am satisfied with enrichment opportunities/experiences my child receives at school. **1 2 3 4 5**

Please comment briefly on the following items: (use the back of the page if needed)

1. What do you like most about your child's school experience?

2. What changes would you like to see made regarding your child's school or classroom experiences?

3. Please provide other comments that will help us understand your attitude toward school and satisfaction with your child's experience in his/her classroom or school.

Appendix C

Sample Items From the *Arlin-Hills Attitude Survey Toward School Learning Processes*

Sample Items From the *Arlin-Hills Attitude Survey Toward School Learning Processes*

	No	Sometimes	Usually	Yes
• We get enough time to help each other in class	○	○	○	○
• Everybody has to work on the same thing at the same time	○	○	○	○
• I have enough chances to work with my friends in small groups	○	○	○	○

Appendix D

Content Area Preference Scale (CAPS)

GUIDELINES FOR ADMINISTERING THE CONTENT AREA PREFERENCE SCALE (CAPS)

You will need:
  Sufficient copies of CAPS
  Sufficient pencils

Approximate time:	For grade 2	15 minutes
	For grades 3–6	10 minutes

Prior to administration:

1. Hand out forms. Remember that you have already written student names on the CAPS forms.
2. Appoint a student monitor to collect questionnaires when students are finished and give him/her an envelope for the task. Tell the students the monitor will collect the questionnaires in an envelope and seal it. Emphasize that the teacher will not see their answers.
3. Write on the board two sample questions:

Swimming is important to me. ☺ 😐 ☹
Agree Disagree

Students should know a lot about swimming. ☺ 😐 ☹
Agree Disagree

Work through both statements showing students how they would circle an answer if they agreed with, were unsure about, or disagreed with each statement.

FOR GRADES 3–6:

4. Use the following statement to help convince students of the confidential nature of their responses.

Today you are going to have the chance to tell us how you feel about different school subjects. You are going to complete a questionnaire. This is not a test and there are no right or wrong answers. The questions are short and will not take much time. We want you to tell us as honestly as possible how you feel about your school subjects. Please put your name on your paper now. Place an X after boy if you are a boy or an X after girl if you are a girl. Put an X after your grade. I will stay in front of the room so I won't be able to see your answers. Answer all the questions. When you are finished, (assistant's name) will collect the questionnaires in the large envelope. No one in school will see your answers. Your questionnaires will be given to some people who are studying how students feel about school subjects. If you have trouble understanding the meaning of words or phrases, raise your hand and I will come to help you.

Are there any questions? Does everyone have a pencil? I have extra pencils if you need them. Remember to answer all the questions.

Please begin.

5. During the session please stand somewhere in the room where it will be obvious to students that you cannot see their responses.

FOR GRADE 2:

4. Use the following statement to assure students of the confidential nature of their responses:

Today you are going to have a chance to tell us how you feel about your different school subjects. You are going to complete a questionnaire that I will read with you. This is not a test and there are no right or wrong answers. The questions are short and will not take much time. We want you to tell us as honestly as possible how you feel about your school subjects.

I will be staying in front of the room as I read the questions to you. I will not be able to see your answers. When we have finished the questionnaires, (assistant's name) will collect them in a large envelope. No one in school will ever see your answers. Your questionnaires will be given to some people who are studying how students feel about school subjects.

Are there any questions? Does everyone have a pencil? I have extra pencils if you need them.

We'll begin. Read the first question.

5. During the session please stand somewhere in the room where it will be obvious to students that you cannot see their responses. This is important if students are to answer honestly.

CONTENT AREA PREFERENCE SCALE (CAPS)

My name is ______________________________

I am a BOY ______ GIRL ______

I am in grade 2 ____ 3 ____ 4 ____ 5 ____ 6 ____

Directions: We would like to know how you feel about some of your school subjects. Please read each statement carefully and circle the face that shows how you feel about each statement. A happy face means that you agree with the statement. A face that is neither happy nor sad means that you are not sure how you feel about the statement. A sad face means that you disagree with the statement.

1.	I learn a lot from reading.	☺ AGREE	😐	☹ DISAGREE
2.	Mathematics is fun to do.	☺ AGREE	😐	☹ DISAGREE
3.	Science is an interesting subject.	☺ AGREE	😐	☹ DISAGREE
4.	I think reading is fun	☺ AGREE	😐	☹ DISAGREE
5.	Learning about other countries is interesting.	☺ AGREE	😐	☹ DISAGREE
6.	Mathematics is simple for me.	☺ AGREE	😐	☹ DISAGREE
7.	Students need social studies classes.	☺ AGREE	😐	☹ DISAGREE
8.	I like to read stories.	☺ AGREE	😐	☹ DISAGREE
9.	I want to take more science classes.	☺ AGREE	😐	☹ DISAGREE
10.	Social studies is important to me.	☺ AGREE	😐	☹ DISAGREE

11.	Students should read often.	🙂 AGREE	😐	🙁 DISAGREE
12.	Science is important to me.	🙂 AGREE	😐	🙁 DISAGREE
13.	I want to know more about the United States.	🙂 AGREE	😐	🙁 DISAGREE
14.	I read stories in my free time.	🙂 AGREE	😐	🙁 DISAGREE
15.	I think mathematics is interesting.	🙂 AGREE	😐	🙁 DISAGREE
16.	Students need science classes.	🙂 AGREE	😐	🙁 DISAGREE
17.	Schools should teach social studies	🙂 AGREE	😐	🙁 DISAGREE
18.	Reading is important to me.	🙂 AGREE	😐	🙁 DISAGREE
19.	Schools should teach mathematics.	🙂 AGREE	😐	🙁 DISAGREE
20.	Students should know how to read.	🙂 AGREE	😐	🙁 DISAGREE

Appendix E

Student Product Assessment Form (SPAF)

Student Product Assessment Form

Joseph S. Renzulli
Sally M. Reis
The University of Connecticut

Rationale Underlying this Assessment Form

The purpose of this form is to guide your judgment in the qualitative assessment of various types of products developed by students in enrichment programs. In using the instrument, three major considerations should always be kept in mind. First, the evaluation of more complex and creative types of products is always a function of human judgment. We do not think in terms of percentiles or standard scores when we evaluate paintings, architectural designs, or the usefulness of a labor-saving device. We must consider these products in terms of our own values and certain characteristics that indicate the quality, aesthetics, utility, and function of the overall contribution. In other words, we must trust our own judgment and learn to rely upon our guided subjective opinions when making assessments about complex products.

A second consideration relates to the individual worth of the product as a function of the student's age/grade level and experiential background. For example, a research project that reflects an advanced level investigation and subsequent product by a first grader might not be considered an equally advanced level of involvement on the part of a sixth grader. Similarly, the work of a youngster from a disadvantaged background must be considered in light of the student's overall educational experiences, opportunities and availability of advanced level resource persons, materials and equipment.

The third consideration relates to the most important purpose of any evaluation—student growth and improvement. This assessment instrument should be used to guide students toward excellence and, therefore, we strongly believe that it should be shared and discussed with students *before* the product is started. In other words, we believe the instrument should be reviewed with students during the early planning stages of the product. Students should have the opportunity to know and fully understand on what basis their final products will be assessed.

Instructions for Using the Assessment Form

Although most of the items included in the form relate directly to characteristics of the final product, it will also be helpful if you have access to planning devices that have been used in the development of the product. Such planning devices might include logs, contracts, management plans, proposals, or any other record keeping system. A planning device can help you to determine if pre-stated objectives have been met by comparing statements of objectives from the planning device with the final product. If such a planning device has not been utilized or is unavailable, you may want to request students to complete a form that will provide you with the necessary background information. It is recommended that some type of planning device accompany all products that are submitted for rating. If it can be arranged, you may also want to interview the student who completed the product.

In using the Student Product Assessment Form it will sometimes be necessary for you to do some detective work! For example, in determining the diversity of resources, you may need to examine footnotes, bibliographies or references, and materials listed on the planning device. You may also want to have the student complete a self evaluation form relating to the completed product. This form may help to assess task commitment and student interest.

The Student Product Assessment Form can be used in a variety of ways. Individual teachers, resource persons or subject matter specialists can evaluate products independently or collectively as members of a team. When two or more persons evaluate the same product independently, the average rating for each scale item can be calculated and entered on the Summary Form. When used in a research setting or formal evaluation situation, it is recommended that products be independently evaluated by three raters. One of these ratings should be completed by the teacher under whose direction the product was developed. A second form should be completed by a person who has familiarity with the subject matter area of the product.

For example, a high school science teacher might be asked to rate the work of an elementary grade student who has completed a science-related product. The third rater might be someone who is independent of the school system or program in which the work was carried out.

Item Format

At first glance the items on the Assessment Form may seem to be long and complicated, but they are actually quite concise. Each item represents a single characteristic that is designed to focus your attention. The items are divided into the following three related parts:

1. *The Key Concept.* This concept is always present first and is printed in large type. It should serve to focus your attention on the main idea or characteristic being evaluated.
2. *The Item Description.* Following the Key Concept are one or more descriptive statements about how the characteristic might be reflected in the student's product. These statements are listed under the Key Concept.
3. *Examples.* In order to help clarify the meanings of the items, an actual example of students' work is provided. The examples are intended to elaborate upon the meaning of both the Key Concept and the Item Description. The examples are presented following each item description.

Important Note: The last item (No. 9) deals with an Overall Assessment of the product. In this case, we have chosen a somewhat different format and examples have not been provided. When completing the ratings for Item No. 9, you should consider the product as a whole (globally) rather than evaluating its separate components in an analytic fashion.

Some of the items may appear to be unusually long or "detailish" for a rating scale but our purpose here is to improve the clarity and thus inter-rater reliability for the respective items. After you have used the scales a few times, you will probably only need to read the Key Concepts and Item Descriptions in order to refresh your memory about the meaning of an item.

Research has shown inter-rater reliability is improved when items are more descriptive and when brief examples are provided in order to help clarify any misunderstanding that may exist on the parts of different raters.

Non-Applicable Items

Because of the difficulty of developing a single instrument that will be universally applicable to all types of products, there will occasionally be instances when some of the items do not apply to specific products. For example, in a creative writing project (poem, play, story) either the Level of Resources (No. 3) or Diversity of Resources (No. 4) might not apply if the student is writing directly from his/her own experiences. It should be emphasized, however, that the Non-Applicable category should be used very rarely in most rating situations.

How To Rate Student Products

1. Fill out the information requested at the top of the Summary Sheet that accompanies the Student Product Assessment Form. A separate Summary Sheet should be filled out for each product to be evaluated.
2. Review the nine items on the Student Product Assessment Form. This review will help to give you a "mind set" for the things you will be looking for as you examine each product.

3. Examine the product by first doing a "quick overview" of the entire piece of work. Then do a careful and detailed examination of the product. Check (√) pages or places that you might want to reexamine and jot down brief notes and comments about any strengths, weaknesses, or questions that occur as you review the product.
4. Turn to the first item on the Student Product Assessment Form. Read the Key Concept, Item Description, and Example. Enter the number that best represents your assessment in the "Rating" column on the Summary Sheet. Enter only whole numbers. In other words, do not enter ratings of 3 1/2 or 2 1/4. On those rare occasions when you feel an item does not apply, please check the NA column on the Summary Sheet. Please note that we have only included an NA response option for Item 9a on the Overall Assessment.
5. Turn to the second item and repeat the above process. If you feel you cannot render a judgment immediately, skip the item and return to it at a later time. Upon completion of the assessment process, you should have entered a number (or a check in the NA column) for all items on the Summary Sheet.
6. Any comments you would like to make about the product can be entered at the bottom of the Summary Sheet.

STUDENT PRODUCT ASSESSMENT FORM
SUMMARY SHEET

Name(s) ______________________ Date ____________

District ____________________ School ____________________

Teacher ____________________ Grade __________ Sex __________

Product (Title and/or Brief Description) ____________________

____

Number of Weeks Student(s) Worked on Product ____________

FACTORS	RATING*	NOT APPLICABLE
1. Early Statement of Purpose	______	______
2. Problem Focusing	______	______
3. Level of Resources	______	______
4. Diversity of Resources	______	______
5. Appropriateness of Resources	______	______
6. Logic, Sequence, and Transition	______	______
7. Action Orientation	______	______
8. Audience	______	______
9. Overall Assessment	______	______
A. Originality of the Idea	______	______
B. Achieved Objectives Stated in Plan	______	
C. Advanced Familiarity with Subject	______	
D. Quality Beyond Age/Grade Level	______	
E. Care, Attention to Details, etc.	______	
F. Time, Effort, Energy	______	
G. Original Contribution	______	

Comments:

Person Completing This Form ______________________________

*Rating Scales: Factors 1-8	Factors 9A-9G
5 - To a great extent	5 = Outstanding
3 - Somewhat	4 = Above Average
1 - To a limited extent	3 = Average
	2 = Below Average
	1 = Poor

STUDENT PRODUCT ASSESSMENT FORM

Joseph S. Renzulli
Sally M. Reis
The University of Connecticut

1. EARLY STATEMENT OF PURPOSE

Is the purpose (theme, thesis, research question) readily apparent in the early stages of the student's product? In other words, did the student define the topic or problem in such a manner that a clear understanding about the nature of the product emerges shortly after a review of the material?

> For example, in a research project dealing with skunks of northwestern Connecticut completed by a first grade student, the overall purpose and scope of the product are readily apparent after reading the introductory paragraphs.

5	4	3	2	1	NA
To a great extent		Somewhat		To a limited extent	

2. PROBLEM FOCUSING

Did the student focus or clearly define the topic so that it represents a relatively specific problem within a larger area of study?

> For example, a study of "Drama in Elizabethan England" would be more focused than "A Study of Drama."

5	4	3	2	1	NA
To a great extent		Somewhat		To a limited extent	

3. LEVEL OF RESOURCES

Is there evidence that the student used resource materials or equipment that are more advanced, technical, or complex than materials ordinarily used by students at this age/grade level?

> For example, a sixth grade student utilizes a nearby university library to locate information about the history of clowns in the twelfth through sixteenth century in the major European countries.

5	4	3	2	1	NA
To a great extent		Somewhat		To a limited extent	

4. DIVERSITY OF RESOURCES

Has the student made an effort to use several different types of resource materials in the development of the product? Has the student used any of the following information sources in addition to the standard use of encyclopedias: textbooks, record/statistic books, biographies, how-to books, periodicals, films and filmstrips, letters, phone calls, personal interviews, surveys or polls, catalogs and/or others?

> For example, a fourth grade student interested in the weapons and vehicles used in World War II reads several adult-level books on this subject which included biographies, autobiographies, periodicals, and record books. He also conducted oral history interviews with local veterans of World War II, previewed films and film strips about the period and collected letters from elderly citizens sent to them from their sons stationed overseas.

5	4	3	2	1	NA
To a great extent		Somewhat		To a limited extent	

5. APPROPRIATENESS OF RESOURCES

Did the student select appropriate reference materials, resource persons, or equipment for the topic or area of study?

> For example, a student who is interested in why so much food is thrown away in the school cafeteria had to contact state officials to learn about state requirements and regulations which govern what must and can be served in public school cafeterias. With the aid of her teacher, she also had to locate resource books on how to design, conduct, and analyze a survey.

5	4	3	2	1	NA
To a great extent		Somewhat		To a limited extent	

6. LOGIC, SEQUENCE, AND TRANSITION

Does the product reflect a logical sequence of steps or events that ordinarily would be followed when carrying out an investigation in this area of study? Are the ideas presented clearly and logically and is there a smooth transition from one idea or subtopic to another?

> For example, a student decided to investigate whether or not a section of his city needs a new fire station with a salaried staff rather than the present volunteer staff. First the student needed to research different methods of investigative reporting such as appropriate interview skills. Next the student conducted interviews with both salaried and volunteer fire station staff. He then needed to learn about methods of survey design and reporting in order to analyze local resident opposition or support for the new fire station. After other logical steps in his research were completed, his accumulated findings led him to interviews with the Mayor and the Board of Safety in the city and then

to several construction companies that specialized in bids on such buildings. His final product was an editorial in the local newspaper which reflected his research and conclusions.

5	4	3	2	1	NA
To a great extent		Somewhat		To a limited extent	

7. ACTION ORIENTATION
Is it clear that the major goal of this study was for purposes other than merely reporting on or reproducing existing information, ideas, or knowledge? In other words, the student's purpose is clearly directed toward some kind of action (e.g., teaching ways to improve bicycle safety, presenting a lecture on salt pond life); some type of literary or artistic product (e.g., poem, painting, costume design); a scientific device or research study (e.g., building a robot, measuring plant growth as a function of controlled heat, light, and moisture); or some type of leadership or managerial endeavor (e.g., editing a newspaper, producing/directing a movie).

For example, a student decides to study the history of his city. After an extensive investigation, the student realizes that other history books have been written about the city. He finds, instead, that no one has ever isolated specific spots of historical significance in the city which are easily located and accessible. He begins this task and decides to focus his research to produce an original historical walking tour of the city.

5	4	3	2	1	NA
To a great extent		Somewhat		To a limited extent	

8. AUDIENCE
Is an appropriate audience specified or readily apparent in the product or management plan?

For example, the student who researched the history of his city to produce an original walking tour presents his tour to the city council and the mayor. They, in turn, adopt it as the official walking tour of the city. It is reproduced in the city newspaper and distributed by the local historical society, library, and given out to registered guests in the city's hotels and motels.

5	4	3	2	1	NA
To a great extent		Somewhat		To a limited extent	

9. OVERALL ASSESSMENT

Considering the product as a whole, provide a general rating for each of the following factors and mark the space provided to the right of the item:

SCALE
5 = Outstanding
4 = Above Average
3 = Average
2 = Below Average
1 = Poor

A. Originality of the idea. _____
B. Achieved objectives stated in plan. _____
C. Reflects advanced familiarity (for age) with the subject matter. _____
D. Reflects a level of quality beyond what is normally expected of a student of this age and grade. _____
E. Reflects care, attention to detail, and overall pride on the part of the student. _____
F. Reflects a commitment of time, effort, and energy. _____
G. Reflects an original contribution for a youngster of this age/grade level. _____

Appendix F

Adaptation of *Classroom Practices–Teacher Survey*

Classroom Practices—Teacher Survey

The National Research Center on the Gifted and Talented

University of Connecticut *University of Georgia*
University of Virginia *Yale University*

NRC
G/T

This study focuses on the nature of regular classroom practices used in schools. You can help us learn more about these practices by taking a few minutes to complete this questionnaire. Please be assured that your answers will be kept strictly confidential and that all reporting will be done at the group level.

I. Teacher Information
Please check the box that describes you.

1. **Gender** ☐ Male ☐ Female

2. **Ethnicity**
   - ☐ Hispanic-American
   - ☐ Caucasian-American
   - ☐ African-American
   - ☐ Asian-American/ Pacific Islander
   - ☐ Native-American
   - ☐ Other (__________)

3. **Years of teaching experience** ____________

4. **Highest Degree Earned**
   - ☐ BA/BS
   - ☐ Ph.D./Ed/D.
   - ☐ MA/MS
   - ☐ Professional Diploma
   - ☐ (Sixth year/Ed. Spec.)
   - ☐ Other (__________)

5. **Training in teaching of gifted/talented**
   (Check all that apply)
   - ☐ None
   - ☐ Course(s) at college/ university
   - ☐ District inservice
   - ☐ Educational degree in area
   - ☐ Workshop outside district

6. **Grade level now teaching** ____________

II. Classroom Practices

This section is designed to provide information about the instructional strategies and approaches you use in your classroom. It is very important that the answers you provide reflect actual practices. Please be assured that your individual responses will be held in the strictest confidence.

If you teach an intact class, please respond to the following items for that class. If you teach in a departmentalized arrangement, please respond to the following items using the subject you teach most often as your point of reference. PLEASE DO NOT CHANGE CLASSES.

Please use the following response scale based on the academic year to indicate what actually occurs in your classroom. We have used the term "average" student in order to distinguish between services provided to all students and services provided to youngsters with special needs. Circle the most appropriate response.

Response Scale

0 - Never
1 - Once a month, or less frequently
2 - A few times a month
3 - A few times a week
4 - Daily
5 - More than once a day

		Average Students					
1.	Use basic skills worksheets	0	1	2	3	4	5
2.	Use enrichment worksheets	0	1	2	3	4	5
3.	Assign reading of more advanced level work	0	1	2	3	4	5
4.	Use self-directed instructional kits such as S.R.A.	0	1	2	3	4	5
5.	Assign reports	0	1	2	3	4	5
6.	Assign projects or other work requiring extended time for students to complete	0	1	2	3	4	5
7.	Assign book reports	0	1	2	3	4	5
8.	Use activities such as puzzles or word searches	0	1	2	3	4	5
9.	Give creative or expository writing assignments on topics selected by the teacher	0	1	2	3	4	5
10.	Give creative or expository writing assignments on topics selected by the students	0	1	2	3	4	5

Response Scale
0 - Never
1 - Once a month or less frequently
2 - A few times a month
3 - A few times a week
4 - Daily
5 - More than once a day

		Average Students					
11.	Make time available for students to pursue self-selected interests	0	1	2	3	4	5
12.	Use pretests to determine if students have mastered the material covered in a particular unit or content area	0	1	2	3	4	5
13.	Eliminate curricular material that students have mastered	0	1	2	3	4	5
14.	Repeat instruction on the coverage of more difficult concepts for some students	0	1	2	3	4	5
15.	Substitute different assignments for students who have mastered regular classroom work	0	1	2	3	4	5
16.	Modify the instructional format for students who learn better using an alternative approach	0	1	2	3	4	5
17.	Encourage students to move around the classroom to work in various locations	0	1	2	3	4	5
18.	Allow students to leave the classroom to work in another location, such as the school library or media center	0	1	2	3	4	5
19.	Assign different homework based on student ability	0	1	2	3	4	5
20.	Use learning centers to reinforce basic skills	0	1	2	3	4	5
21.	Use enrichment centers	0	1	2	3	4	5
22.	Teach thinking skills in the regular curriculum	0	1	2	3	4	5
23.	Teach a unit on a thinking skill, such as critical thinking or creative problem solving	0	1	2	3	4	5
24.	Participate in a competitive program focusing on thinking skills/problem solving, such as Future Problem Solving, Odyssey of Mind, etc.	0	1	2	3	4	5
25.	Use contracts or management plans to help students organize their independent study projects	0	1	2	3	4	5
26.	Provide time within the school day for students to work on their independent study projects	0	1	2	3	4	5
27.	Allow students within your classroom to work from a higher grade level textbook	0	1	2	3	4	5
28.	Provide a different curricular experience by using a more advanced curriculum unit on a teacher-selected topic	0	1	2	3	4	5

Response Scale

0 - Never
1 - Once a month or less frequently
2 - A few times a month
3 - A few times a week
4 - Daily
5 - More than once a day

		Average Students					
29.	Group students by ability across classrooms at the same grade level	0	1	2	3	4	5
30.	Send students to a higher grade level for specific subject area instruction	0	1	2	3	4	5
31.	Establish interest groups which enable students to pursue individual or small group interests	0	1	2	3	4	5
32.	Consider students' opinion in allocating time for various subjects within your classroom	0	1	2	3	4	5
33.	Provide opportunities for students to use programmed or self-instructional materials at their own pace	0	1	2	3	4	5
34.	Give assignments that encourage students to organize their own work schedule to complete a long range project	0	1	2	3	4	5
35.	Provide questions that encourage reasoning and logical thinking	0	1	2	3	4	5
36.	Ask open-ended questions	0	1	2	3	4	5
37.	Encourage students to ask higher-level questions	0	1	2	3	4	5
38.	Encourage student participation in discussions	0	1	2	3	4	5
39.	Use computers	0	1	2	3	4	5

COMMENTS

Please provide any comments you believe will help us in understanding classroom practices within your school.

Thank you very much for your help.

Appendix G

Student Roster

STUDENT ROSTER

Teacher's Name ______________________ School ______________________

I. Please list students' names, ethnicity [Caucasian-American(**CA**), African-American (**AF**), Asian-American(**AS**), Hispanic-American(**HA**), Native-American(**NA**), Other(**O**)] in the columns below.

II. In the Overall Academic Performance column, please provide general numerical ratings of each student's academic performance level within the class, using the following scale: 5=superior, 4=above average, 3=average, 2=below average, 1=low. Please do not spend a lot of time thinking about this - record your first reaction.

III. In the special program column, indicate the students who have been formally identified for a special program (special ed, gifted ed, bilingual, Chapter 1) by naming the program for which they receive special services.

Students' Names	**Gender**	**Ethnicity**	**Special Program**	**Reading Performance**	**Mathematics Performance**
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					

Appendix H

Enrichment Cluster Student Evaluation
(K-2 and 3-6)

Enrichment Cluster
Student Evaluation K-2

Grade: ____________ Cluster Name: ________________________

We would like to know how you feel about your experience in your Enrichment Cluster. Please read each statement carefully and circle the face that shows how you feel about each statement. A happy face means that you agree with the statement. A face that is neither happy nor sad means that you are not sure how you feel about the statement. A sad face means that you disagree with the statement.

1.	I liked my cluster.	☺ Agree	😐	☹ Disagree
2.	I learned new things in my cluster.	☺ Agree	😐	☹ Disagree
3.	My cluster teacher was interesting.	☺ Agree	😐	☹ Disagree
4.	I would like to be in an Enrichment Cluster again.	☺ Agree	😐	☹ Disagree

Please answer the following questions:

5. I think an Enrichment Cluster should be offered on the following topic

6. One thing I learned in my Enrichment Cluster was

7. The thing I like best about my Enrichment Cluster was

8. One change I would make to improve my Enrichment Cluster is

Enrichment Cluster
Student Evaluation 3-6

Grade: ________ Cluster Name: ________________________

We would like to know how you feel about your experience in your Enrichment Cluster. Please read each statement carefully and circle the number that shows how you feel about each statement. A number 1 means that you agree with the statement. A number 2 means that you are not sure how you feel about the statement. A number 3 means that you disagree with the statement.

1. I enjoyed my cluster.	**1** Agree	**2**	**3** Disagree
2. I learned new information/skills in my cluster.	**1** Agree	**2**	**3** Disagree
3. My cluster teacher was interesting.	**1** Agree	**2**	**3** Disagree
4. I am interested in participating in more Enrichment Clusters.	**1** Agree	**2**	**3** Disagree

Please answer the following questions:

5. I think an Enrichment Cluster should be offered on the following topic

6. One thing I learned in my Enrichment Cluster was

7. The thing I like best about my Enrichment Cluster was

8. One change I would make to improve my Enrichment Cluster is

Appendix I

Enrichment Cluster Facilitator Evaluation Form

Enrichment Cluster
Facilitator Evaluation Form

Name (Optional) ____________________

Your feedback and input are essential to the success of the Enrichment Cluster Program. By taking a few minutes to complete the evaluation questions below, you will be assisting us in improving and further developing Enrichment Clusters for your students.

1. What did you enjoy most about facilitating your cluster?

____
____
____
____

2. Were the clusters well organized? How can the program be changed or improved?

____
____
____
____

3. What were the students' reactions to your cluster?

____
____
____
____

4. What types of Advanced Content did you present in your cluster?

____
____
____
____

5. What products (if any) were produced by students in your cluster?

____
____
____
____

(Over)

6. Are you interested in facilitating another cluster? Yes ____ No

   If yes, what topic?

7. Can you recommend other potential facilitators and possible topics for the next session?

8. What recommendations would you make for scheduling the clusters (i.e., how many sessions, length of sessions)?

9. Other comments:

Thank You!

Appendix J

Sample Enrichment Cluster Offerings
(Also available from the authors in Spanish translation)

Sample Enrichment Cluster Offerings

Young Aviators Flight School ***Grades 2-5***
Join Paul Varga and explore the dynamics of flight. p Learn about forces that cause changes in air pressure, lift, thrust, drag, and gravity. A possible field trip to the local airport will provide a close-up view of airplanes. Paul is a flight instructor and has been flying for over 10 years, and has had an interest in aviation since he was in elementary school.
10 weeks

Puppeteers Workshop ***Grades K-5***
So you want to be a puppeteer? Learn how to create several different types of puppets, such as finger puppets, hand puppets, marionettes, and more. Experiment and develop your own character. Help write, direct, or star in a puppet show, and bring your puppet to life in a performance! Join puppeteers Ms. Baker and Ms. Bonet.
10 weeks

The Young Scientists' League ***Grades 2-5***
Explore the world of chemistry and volcanoes with Philip Insalaco. Make predictions and conduct experiments, and discover the dynamics of a volcano, and what happens when one erupts. You will have the opportunity to construct your own volcano, using wire mesh, wood and papier mâché, and create "lava" using a chemical reaction with two kitchen ingredients! Wear old clothes or bring a smock.
10 weeks

League of Engineers ***Grades 1-5***
Have you ever wondered how a skyscraper or a bridge is built? Using blocks, you will have the opportunity to explore balance, construction, design and representation to create structures found in cities of the world. First grade teacher Mrs. Elliot has made blockbuilding part of her curriculum for several years, and has found that students can learn about math, science, social studies, etc. through block play. She will be working with 4th grade teacher Ms. Bentley.
5 or 10 weeks

The NASA Exploratory Group ***Grades K-3***
Are you curious about asteroids, stars and planets? Come discover the solar system and the field of astronomy with Roxanne Hosking, an earth science educator and assistant director at Eastern Connecticut State University's new planetarium. Examine NASA clips of the comet hit on Jupiter, learn about the evolution of the solar system, design your own "planetarium," learn what it is like to be a space explorer, and more. You will discover all that a planetarium offers, and may have the opportunity to visit one and view a night sky during the day!
10 weeks

Forest and Wildlife Biologists Society ***Grades 3-5***
Explore the world of the biologist! With UConn natural resources student Kevin O'Shea you might build a birdhouse, search for bones in a pellet coughed up by an owl, assemble the bones, examine real skulls and skins, search for wildlife outside, learn the basics of identifying trees, and more! Background material for this cluster will come from James Goodwin State Forest.
10 weeks

Invention Convention ***Grades 2-5***

Are you an inventive thinker? Would you like to be? Brainstorm a problem, try to identify many solutions, and design an invention to solve the problem. Create your invention individually or with a partner under the guidance of Bob Erikson and his colleagues, who work at the Connecticut Science Fair. You may share your final product at the Young Inventors' Fair on March 25, a statewide day-long celebration of creativity.

5 weeks

The Young Archaeology Association ***Grades 2-5***

Step back in time 100 million years and explore the world of dinosaurs with staff from Dinosaur State Park, 2nd grade teacher Ms. Grenier, and parent Uta Johnson. Learn about geologic time, invertebrate fossils and fossil plants, how fossils are formed, and how archaeologists uncover these mysteries. Possibly create your own casts, "dig" for fossils in plaster, and more.

5 weeks

The Chimers Handbell Choir ***Grades 4&5***

This cluster is for those who enjoy music! This group will travel to St. Joseph's Church to learn how to create the beautiful music of handbells. Students will get the opportunity to participate in a group choir and learn how to operate the handbells with the goal of a group performance for the school. Join Angela Riccardo Salcedo, Music Director & Organist at the Congregational Church. She will be assisted by Reading Teacher Marsha Creese, who plays in the handbell choir at the Congregational Church, and School Nurse Mari Shooks, who plays in the handbell choir at St. Joseph's.

5 weeks

Natural Resources Conservation Service ***Grades 2-5***

Do you know where your next meal will come from? Most of us are not farmers, but here is your chance to learn about the soil, the rain, and the machines needed to grow our food. Come join local scientists Joyce Meader, Liz Rogers and others from the Cooperative Extension Service at UConn as you investigate hydrology, engineering, the science of soil, planting equipment, and finally the resulting food.

5 weeks

The Colonial Artists Workshop ***Grades 2-5***

Step back in time and experience how the early settlers of Colonial America lived! Each week you will explore different topics of Colonial life. Experiment with crafts that were a part of everyday life, such as candlemaking, stenciling, quilting, relief printing, or weaving. Join parent and local historian Bev York, paraprofessional Ms. Treend, and 5th grade teacher Ms. Sansom. Wear old clothes or bring a smock.

5 weeks

The Science of Power ***Grades K-5***

What are our sources of energy? What can we do to conserve energy? Explore electricity and learn about amps, voltage, circuits, alternating current and direct current. You will also investigate the sun and water as sources of energy and how this energy is captured and directed for many uses. Join Joyce Burdick from CL&P as you explore energy and energy conservation.

5 weeks

Appendix K

Enrichment Cluster Interview Protocol

Enrichment Cluster
Interview Protocol

1. What were your impressions prior to teaching the cluster?

2. How did your perceptions change?

3. What did you find working with children in your cluster?

4. What advanced content were you able to use with students? Did the levels of content surprise you?

5. Did you prepare too much or not enough material for your cluster?

6. What student products emerged as a result of your Enrichment Cluster? (How many students were involved in producing products?)

7. How much was your cluster directed by student interests?

8. What do you feel is the optimal number of sessions for your Enrichment Cluster to develop quality student products?

9. How long should each session meet?

10. How many sessions would you be able/willing to facilitate?

11. Do you feel students worked at home on their Enrichment Cluster projects or do you feel they will continue their studies as a result of their Enrichment Cluster involvement? Explain.

12. What "real world" methodologies were addressed in your cluster?

13. Were you limited in what you could do in your Enrichment Cluster as a result of financial constraints? Explain.

14. Please comment on the number of students in your cluster and the range of ages.

Appendix L

Facilitator Interviews

Young Sculptors, Inc.

Facilitated by Richard Jaworowski, a local artist who has exhibited with the National Sculpture Society in New York and has pieces in private collections throughout the U.S. He has often shared his studio with students.

How does a sculptor work? How is a piece of "rock" transformed into a work of art? What happens to the finished piece? Explore the process of creating your own 3-dimensional work of art using authentic tools and plaster. You may discover that creating your piece is as much fun as enjoying the finished product! View some works in marble and learn about one artist's perspective. Richard Jaworowski is a local sculptor who has been carving for over 20 years.
P.S. Wear old clothes or bring a smock.

> **Richard Jaworowski:**
> *I have been intensely interested in art all my life. But no one ever told me, "Richard, you can be an artist when you grow up." It just wasn't an option. I was totally led to believe that if I wanted to be an artist, I was insane and it was impossible. The enrichment clusters sounded interesting to me because they were a chance to present art as a serious career option to some kids. It was fun for me to say to kids, "Look at me, this is a real and exciting profession. It's not impossible."*
>
> *The most impressive thing, early on, was the students really seemed to get a grasp on the origins of the ideas I use for my sculpture. I would explain to them how different creations came into being, whether they were representations of emotional states, hate or love, or whether they were abstractions of the human form. It was incredible how they picked up on it. This really got them thinking about what they wanted to do with their own sculptures. Their insights were great. I was also impressed with their questions throughout the cluster: questions about technique, how long it takes to make a piece, and how much I sell one for. I thought these were real good, real world questions, things that no one ever touched upon when I was a kid.*
>
> *At the beginning of the cluster, I presented my sculpture and my process to the kids, but I left the direction open. Surprisingly, everyone expressed a desire to follow my lead. I usually work with marble, but I knew plaster would be more appropriate for a beginning project, and a lot easier to handle. I was a little concerned because I thought that perhaps the kids might rapidly find sculpting boring; that they might be somewhat discouraged when they found out it actually involved hard work, or disappointed if they came up with a pile of dust. Their projects were all individual; everybody started something. I tried to explain to them when they started that the journey is its own reward, and if they ended up with nothing tangible in their hands, that was OK, they were still going to learn a lot from it. At the end of the series, they all walked out with a sculpture or sculpture in process, and their enthusiasm level was very high. They turned out to be attentive and enthusiastic. It was terrific.*

Gamers Institute

Facilitated by Lynn Weeks, Parent and School Volunteer

Explore the world of math games and puzzles with parent Lynn Weeks. Investigate visual games and optical illusions, dice games and probability, origami, games of logic, problem solving brain teasers, and more. Learn how a games company might develop their popular games. Develop your own board game or puzzle, and share with the group in a game "meet."

Lynn Weeks:

When I first heard about the enrichment clusters, it was as a parent. I thought, this is a great opportunity for some talented adults to come in and share their experience with our kids. I was particularly excited for my own children, who were thrilled with the selection of clusters during the first series in the fall. When the spring series came around, someone approached me and asked if I wanted to organize one. I didn't really consider myself as someone who could facilitate a cluster. My first response was, "No way, I don't have an area of expertise, I'm not an expert in anything." However, when I saw a list of possible cluster descriptions, "Math Games" caught my eye. It sounded like fun!

The first thing we did was take a few weeks to explore some popular games, play them, and find out what we liked about them and why. I tried to challenge the kids by posing questions often. Once we started each game, we would ask ourselves: What will drive the pieces through the game? Why would someone want to play this game? What age players would like this game? Can this age child read or count well enough to do this? Is the game attractive? Does it have an end or objective? Does the premise even make sense? I also challenged their ideas on a regular basis to help them discover insights into successful games. We explored other things like images and shadow games, probability with dice and coins, visual games and optical illusions, and symmetry and mirror images.

Once we investigated a variety of games, their strategies and goals, the kids were eager to develop their own board games. Some kids chose to work in pairs or small groups, and others created individual projects. Actually designing the games took awhile, and the kids were very proud of their finished products. They enjoyed playing them with each other, where they made suggestions regarding refining each others' games. Most of the kids took their games home to share with family. The whole experience was really worthwhile.

Invention Convention

Facilitated by Robert Erikson, Physicist and Supervisor of Teaching Labs, University of Connecticut; Max Nam, Physics student at the University of Connecticut; and Sandra Rijs, Third Grade Teacher

Are you an inventive thinker? Would you like to be? Brainstorm a problem, try to identify many solutions, and design an invention to solve the problem, as an inventor might give birth to a real invention. Create your invention individually or with a partner under the guidance of Bob Erikson and his students, who work at the Connecticut Science Fair. You may share your final product at the Young Inventors' Fair on March 25th, a statewide, day-long celebration of creativity.

Robert Erikson:

When it comes to working with young people, I have a hard time saying no. Young people need to be given the opportunity to reach inside and pull out to create something. I have the expertise in some areas, and I feel I should make use of that and help people. My interest in inventing is from the point of view of a physicist, working with materials. I'm always working on new ways of handling equipment . . . so I'm very much into working with something new, trying to get it to work.

In the Invention Convention Cluster, we worked with young people and tried to get them to come up with an idea, express that idea verbally, then be able to put that down on paper and come up with some kind of design. Once they came up with some dimensions and materials they needed, they could begin working to put together a project. In working on a project they had the opportunity to see what might go wrong, what might go right, and they had a chance to work with tools for the first time, and do things they hadn't done before. Each student selected his/her own project. If they weren't quite sure what they were talking about, we would prod them until they had a direction . . . but it was all on their own.

There were two types of products I saw from this cluster—one was the finished product, the physical product they could grab hold of and work with and use. The other was the student's understanding what it means to take an idea and go all the way to the end, and his/her realization that it takes more than one try to finish. Students understood how to ask the question, "What do I do next? What if I did this?"

The most enjoyable thing in working with the cluster was watching the students as they began to dig in, pull out from inside, work towards a project, and see success with that project. Cluster are a superb idea. It gives the opportunity for outsiders to come in and work with students and teachers to help develop the thought process. It is well worth pursuing.

Computer Connection

Facilitated by Paula McNally, Art Teacher and Internet Enthusiast

This cluster offers an introduction to the new classroom version of Prodigy. You will explore the advantages of working on-line, and discover the infinite ways to use the "information superhighway." Learn and play some of the games, and communicate with students in another school, with a goal of arousing interest for exploring on-line with other students at the school. Become the "on-line expert" and help others in your school learn how to access the information superhighway!

> **Paula McNally:**
>
> *I chose an enrichment cluster having to do with computers and getting on-line with classroom Prodigy. When I bought my computer two years ago, I knew absolutely nothing at that time. I eventually learned about the internet and who knows where it will take me from here. I chose this cluster because I'm really excited about it . . . . I can do what I enjoy, learn more, and share it as well. I really enjoy facilitating enrichment clusters because it's so different from what I normally do. I enjoy the change.*
>
> *In the cluster we reviewed some of the updates from Maya quest, which is an on-line real adventure where bicyclists are going across Mexico and into Belize and some of the South American countries. We followed them along and tried to pinpoint them on the maps, show where they're going, and we did that while students took turns on the computer writing their pen pal.*
>
> *The students directed their learning in ways I wasn't sure was going to happen. I had a good idea that they'd really be interested in the Mayans and the adventure, in exploring cultural aspects of the Maya quest—their ways of life, clothing, food, geography, and art. I took them through a lot of parts of Prodigy and then to games, quizzes, the bulletin board, and E-Mail. Sending E-Mail was totally new to most children, and they really became interested in it.*
>
> *The students responded favorably to the cluster by coming up during their own free time to write letters and get onto Prodigy. Our enthusiasm even spilled over into an enrichment class. I had hoped that the students would go back to their classrooms and show other students how to use the computer. This happened—one of the students who had a pen pal got a letter saying they really needed a boy as well, so she talked to another boy in her class and he joined on as well. Some exchange also happened while we were sharing a room with another cluster. The kids in the other cluster were interested, so we showed them how to use the E-Mail, and now they have pen pals as well. They really enjoyed that contact.*

Chimers Handbell Choir

Facilitated by: Angela Riccardo Salcedo, Music Director and Organist at St. Andrews Church, Marsha Creese, Reading Specialist and Handbell Choir Member and Mari Shooks, School Nurse and Handbell Choir Member

This cluster is for those who enjoy music! Travel to St. Joseph's Church to learn how to create the beautiful music of handbells. Students will get the opportunity to participate in a group choir and learn how to operate the handbells with the goal of a group performance for the school. Join Angela Riccardo Salcedo, music director and organist at the Congregational Church. She will be assisted by Reading Teacher Marsha Creese, who plays in the handbell choir at Storrs Congregational Church, and School Nurse Mari Shooks, who plays in the handbell choir at St. Joseph's.

> **Marsha Creese:**
> *My interest in a handbell choir began when my daughter played in a handbell choir, and I was so enthralled with it. My church started a handbell choir five years ago, and we were asked who might be interested in joining. I'm not a formally trained musician, but I had such an interest in it and a love of it I thought I would give it a try. When we started the enrichment clusters at school, I thought it would be a wonderful experience to share with the kids.*
>
> *At first, we didn't have a lot of kids who signed up, primarily because I don't think they even knew what a handbell choir was. Once we got a group together, it was really exciting . . . first of all to see their excitement, and then to watch their amazement as they began to learn—some of them for the first time—the value of a note, what a measure is, the tempo. When we arrived at the church each week, they couldn't wait to get up to the balcony and begin; everyone raced up the ladder. I think probably the most exciting part of the cluster for me was watching their pride grow as they progressed, and their sheer amazement as we got through a piece for the first time. It was also interesting watching the group work as a team. Sometimes you have to be patient while another part of the group practices, another time you get to play, and then you all come together.*
>
> *Our goal for the cluster was to perform in front of the school, which we realized one Friday afternoon. It was valuable for friends to see and hear what we had been doing all these weeks, and it was important too for the students in the cluster to be able to work toward this performance. They experienced what real musicians experience: practice, preparation, and finally the joy of the performance and sharing the joy they had in the music. It's been a real learning experience for the students, and one they have thoroughly enjoyed.*

Police Academy

Facilitated by: Detective Lee Griffin, Local Police Department

In this cluster, you will learn how to investigate a crime. What are the first steps you must take? How will you go about solving the mystery? Work with others in the cluster to develop an original product as a result of being involved in the police academy. Learn about the realities of detective work and the service that police officers provide with professional police officer Lee Griffin.

> Lee Griffin began his cluster by determining what students actually know about police work. Many students have the wrong impression based upon their own experiences and exposures. Lee creates a crime, with the help of a "stranger," and gives the students the tools they need to solve the mystery. They talk about physical characteristics, lawful procedures and making arrests. With these skills, the students are able to become better citizens and witnesses. They learn more about their community and how they can work to be better neighbors.
>
> **Lee Griffin:**
> *I got involved with the school system when I joined the Board of Education. I've done several programs within the school system and got involved in the clusters over the last year. I've done the Police Academy because I thought it was a very good cluster for the students to get some exposure to. What we try to do in our cluster is just a basic lesson in what police officers do from the time that they receive a call at the police department, through the investigation and into what happens afterward, the paperwork end of it! The children enjoy the clusters very much. They get very hands on with a lot of the material. We try and give them exposure into what it's like to be a police officer and to actually investigate. I absolutely love doing clusters. It gives you a lot of pleasure to see children really interested in your field and what you're doing.*

Young Artists Guild

Facilitated by Mary Taylor, Art Teacher

What in art turns you on? Are there skills you want to learn? Artists you want to discover? Creations you want to build? In this cluster you will be able to choose an area of interest such as calligraphy, drawing, sculpture, or whatever turns you on and learn how to perfect your skills in that area. Come sharpen your tools with art teacher Mary Taylor.

> This cluster begins by having the students fill out an art interest survey so that she can discover what her students want to learn. Each student then goes to work in a small group by themselves or with others sharing the same interest. You find a group working with ink drawing, another handful of students studying basic drawing, a small cluster working on calligraphy and several students working by themselves on

small projects. They display their work in the school, at the town hall and other appropriate areas.

Mary Taylor:
I began my cluster because it was brought to my attention that there was quite a large number of students who were interested in drawing and since that is, in my opinion, the basis for so much of art, I was happy to be involved with this cluster. What I enjoy most is that the enrichment cluster is really student centered in terms of interest; there is not a curriculum to specify what we have to teach and in my art program, even though I was involved in curriculum planning and creating the curriculum that I teach from, this is entirely different because it is child driven in terms of focus, going with the children's interest.

History of the Motion Picture
Facilitated by Richard Larson, Teacher and film enthusiast

Explore the world of movies and film makers. Students will be introduced to the first motion picture, *The Great Train Robbery*, silent pictures and the great influences of the era. They will also pursue an in-depth study of specific film genres, such as Horror, Comedy or Sci-Fi. Richard Larson, a fourth grade teacher, is a graduate of the University of Hartford who is fascinated with the Golden Age of Hollywood. Students in this cluster work on film reviews for the student body and are encouraged to create their own film posters.

Richard Larson begins his cluster with a horror movie. Students approached him in the hall before clusters even began to request the horror genre within films. With the limited amount of time for the cluster, students are only able to sample many of the thousands of titles Mr. Larson wanted to introduce. Students are able to borrow the videotapes, take them home and share them with their friends and family. They are encouraged to share their opinions and to compare the old films with current movies. Mr. Larson has created a section devoted to the history of film in the library so students can pursue their interest even further.

Richard Larson:
What happens when you teach any kind of cluster is that you're going to have a cross section of kids with all kinds of skills in all different kinds of areas. So I've found out there are some kids who would really enjoy using their writing skills and they can write reviews; they love to be critics. We have kids that are very artistic and they can lend their artistic talents to producing posters and the great thing about this is that they have not seen the original movie posters. I would also like to see the kids create monsters from some of the movies and possibly backdrops or dioramas, which then, once the kids have those skills, can be incorporated into the regular classroom when they read novels and do book sharing projects. So, really there is no limit and I'm

going to let it go as far as the kids want it to go; because as I go along, I find out there's more that I'm learning and new possibilities can open up.

Young Authors

Facilitated by Ann Doros, Language Arts Consultant

Let your imagination be your guide in this cluster offered by Ann Doros, Language Arts consultant. Become a genuine author by writing creatively in a variety of genres such as poetry, fiction, drama, and short story. If you would like, you can enter finished pieces in contests and/or send them to various children's magazines for publication consideration.

Ann Doros begins her cluster by introducing her students to the basic story structure and to different genres. The students are most anxious to just write and many students produced several stories covering a broad range of topics. Students create their own magazine for the library, write articles for the school newsletter, and submit stories for publication.

Ann Doros:

What I enjoy most about teaching the enrichment clusters is that I work with students one to one that I normally would not have the opportunity to do so. I get to know the students personally and we get a finished copy at the end. That's satisfying for me and also the students. I would expect that the students be able to take a piece from the brainstorming through writing, editing and to final copy. One thing we will do is create a magazine for their work and another is to submit some of the pieces for publication consideration.

Dioramas

Facilitated by Alex Dolphin, 6th grade student and expert creator of dioramas

Explore the world of three dimensional thinking! Students will decide what problem they would like to solve and then create a small world that represents their solution. Come work with Alex Dolphin, a sixth grader who has created many extraordinary dioramas.

This cluster begins by having students decide what they want to represent in their dioramas. They discuss how the problem can be resolved and represented, then they make a list of the materials they will need to create a diorama. One of the first dioramas created in this cluster was a representation of the book *The Polar Express*. Once the diorama was built, the students put it on display near the front entrance of the school for everyone to see when they came to the winter concert. You might want to make a diorama that is a teaching aid for one of your classes or one that will help tell a story to younger children.

Alex Dolphin:
I love working with dioramas and wanted to share my expertise with the other students. Most of the younger students wanted to do their own diorama rather than a group project which made it more difficult for me but we were able to work through it. We could have used a lot more time since it takes a while to get set up.

How do I Work?

Facilitated by Dr. Michael Gerich, Physical Education Teacher and Baseball Player and Kelli MacFarlane, Physical Education Teacher

Come try activities designed to enhance your total body awareness. Cluster members will discover how to use their minds to become more skillful, fit, and knowledgeable about their physical abilities. Brainstorm and determine ways to have an impact on ourselves and others who may not have an interest in personal fitness. Our personal trainers, physical education teachers Dr. Michael Gerich and Kelli MacFarlane, will guide us as we learn about our bodies and how to design personalized fitness programs for ourselves or members of our family.

Dr. Gerich begins his cluster by asking students to guess at their abilities. He introduces many activities and challenges for the students and provides stethoscopes, blood pressure monitors and fat calipers for his cluster to use in determining their fitness. As a final cluster activity, Dr. Gerich takes a field trip to a local health club so that students can learn about the different choices they can make as consumers in a health conscious world.

Dr. Gerich:
I was concerned about the possible behavior of two of my students, but they were absolutely wonderful and had a great time at the fitness center. They tried all the machines, listened to the instructors and learned about heart rates and other fitness techniques. It would be a great thing to have all the clusters go on field trips to experience real world applications.

Research Monograph Series

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